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THE

PSYCHOLOGICAL BULLETIN

PSYCHOLOGICAL PROGRESS IN 1908.

BY PROFESSOR EDWARD FRANKLIN BUCHNER,

Johns Hopkins University.

It is not difficult to hear some one occasionally sounding a note of despair, and bewailing the state of the science of psychology to-day as 'one huge welter of conflicting demands, among which the most recent or the loudest voice is apt to receive attention.'[1] As one thumbs the pages of the psychological output in quest of evidence of progress, renewed assurance thereof comes very quickly. In spite of the momentary eddies of debate and doubt, the current of our knowledge of consciousness moves onward stronger and stronger, gathering into itself the contributions from tributaries in all directions. The refinement of methods, the extension of investigations, and the criticism of interpretations show our psychology of to-day to be marked by the following notable traits. In outgrowing the 'text-book' and 'treatise' stages, it has ceased to be fragmentary, on the one hand, and has become impersonal, on the other. Its orderliness as a system of facts and knowledge has acquired a convincing nature which raises high its degree of credence among the other sciences. In connection with these acquisitions, which, of course, cannot be guaranteed by the deeds of any single brief chronological period, it must be remarked that the year just closed has been characterized by a number of contributions of widely divergent range bringing the general hypothesis of evolution closer to the problems of psychology, and, in turn, taking the vantage points of the science over to the present needs of the theory.

A most interesting, if not, perhaps, the most distinctive, achievement of the year is to be found among the credits of American psychology. Miss Washburn's book performs the special service of giving

[1] Tawney, 'Ultimate Hypotheses in Psychology,' *Journ. of Phil., Psych. and Sci. Methods*, Aug. 13, 1908.

the first systematic presentation of the recently developed field indicated by its title.[1] At the same time its appearance is indicative that animal psychology is a most vigorously exploited field in which, during these passing years, more fresh knowledge is appearing than ever before. In contrast with the rather noticeable effort of animal psychology to try to get along without 'consciousness' in the animal, appears the use of the term 'mind' in the adopted title of the work and the author's explanation of its suggested title as 'The animal mind as deduced from experimental evidence.' With respect to the knowledge it gathers and systematizes this work is even more notable in the fact that it incorporates only those results obtained by experimentally determined methods of investigation. The future of this branch of the science should be forever different from its past by reason of the probable successes in its clear-cut arrangement and organization of our growing information about mind in the animal series.

We may doubt whether we shall ever have to speak of a botanical psychology. But we should not fail to recognize that the needs of botanical interest in the general evolutionary hypothesis have in a recent expression found a new debt which is owing to the theoretical power of our science. In the 'Address of the President of the British Association for the Advancement of Science,' Francis Darwin gives a new expression to the mnemic conception of evolution, and demands that psychology should be given more weight in the constructive considerations of organic processes.[2] In advancing the old theory of the identity of memory (ontogenetic) and inheritance (phylogenetic) he relies upon Semon's conception of the *engram*, or the trace of a stimulus left on the organism, and urges that the possibility of the existence of the psychic in plants really improves the integrity of the general theory of evolution as a whole. It is impossible for us to "know whether or not plants are conscious: but it is consistent with the doctrine of continuity that in all living things there is something psychic, and if we accept this point of view we must believe that in plants there exists a faint copy of what we know as consciousness in ourselves." If the mnemic theory is fortunate in 'giving a coherent theory of the rhythm of development,' and 'makes the positive value of natural selection more obvious,' it is not impossible to foresee the time when it will be commonly recognized that evolution as a theory will find its truest and most fitting abode in psychology.

[1] *The Animal Mind; A Text-Book of Comparative Psychology*, New York, 1908.

[2] Dublin meeting, Sept. 2, 1908; see *Nature*, Sept. 3, 1908, or *Science*, Sept. 18 and 25, 1908.

The question of the modes of approach to consciousness is still open for debate and endeavor, and any positive advances should be welcomed. The numerous oppositions and conflicting points of view are newly presented by Gutberlet[1] and Ribot.[2] Noting in his experiments on judging lifted weights that differences of stimuli would not always be sensed the same, Urban was led to a theory of certain probabitities of judgment, and describes methods of applying the calculus of probabilities to psychological experiments.[3] These are regarded as offering new means of determining the threshold of sensations, not in terms of sensations themselves, but as a difference with probabilities of having judgment passed upon it. The psychometric value then becomes 'the functions which give the dependence of the probabilities of the judgments on the differences of the stimuli.' At the same time this new method for finding thresholds is advantageous for comparing the points of subjective equality in different subjects. The old question, 'What difference is perceptible?' must be supplemented by asking 'Just perceptible how often?' The novelty which Féré noted twenty years ago, that the galvanometer showed changes when the subject, through whose body the current was passing, was affected emotionally, bids fair to give us another mode of approach to some aspects of consciousness. At any rate, the psycho-galvanic reaction offers itself now in competition with the pneumograph and the plethysmograph. Jung and his co-workers Peterson, Ricksher and Binswanger are persevering in their efforts to test the range and efficiency of the method.[4] The applicability of the method awaits further and more accurate determination. The preliminary results are interesting in some respects, especially in the showing of Ricksher and Jung, where it appears that 'the galvanic reaction depends on the attention to the stimulus and the ability to associate it with other previous occurrences.' Normal cases show a marked 'expectation' curve before the stimulus and the curves in these cases are 'as a rule always greater than pathological reactions.' In Binswanger's exhaustive study on associations made by this method, it seems to be true that it is only affective and not intellectual states

[1] 'Der Gegenwärtigestand der psychologischen Forschung,' *Phil. Jahrbuch*, Bd. XXI., pp. 1 ff.

[2] *Essais sur la méthode dans les sciences* (Essai X., 'Psychologie'), Paris, 1908.

[3] *The Application of Statistical Methods to the Problems of Psychophysics*, Philadelphia, 1908.

[4] Peterson and Jung in *Brain*, July, 1907; Ricksher and Jung in *Journ. of Abnorm. Psych.*, Dec., 1907–Jan., 1908; Binswanger, *Journ. für Psych. und Neur.*, Vol. X., 1908 (XI. Beitrag).

that produce galvanic changes. 'Tarchanoff's reaction' has at last a chance to vindicate itself as a possible addition to our permanent equipment in matters methodological.

As in former years the physical conditions of consciousness continue to exercise the ingenuity of students and critics. The old question as to the nature of the conduction of the nervous impulse seems approachable from the recently noted effects of temperature on reaction velocity. In securing forty-eight quotients from forty-three nerves, Maxwell comes upon results in terms of temperature coefficients of the velocity which seem to indicate definitely that nervous conduction is a chemical, and not a physical, process.[1] A revision of our views of the mechanism and functions of audition seems to be well under way in the newer studies on the structure of the inner ear which have been carried on by Meyer, Shambaugh and Kishi.[2] The Marie question last year in cerebral localization seems to come to a final issue with Moutier, who elaborately and exhaustively goes over the data and interpretations involved in the 'new theory of aphasia' and attempts to show that 'Broca's aphasia' does not exist.[3]

The activity within our psychological laboratories continues unabated, and is extending over the widest possible field. No suspected psychophysical relation or sequence is too minute to receive elaborate care in the hands and appliances of the experimenter as such. This is neither the time nor place to sketch the directions which are being progressively mapped out for the future inquiries which are to be based on present acquisitions. In many respects it seems that it is what might be called the pedagogical requirements of experimental psychology which is the initiative of the systematic achievements in the laboratory manuals of recent years. To this list of available works, Seashore has made a contribution by judiciously selecting a few representative experiments which may be performed before the student goes into the laboratory.[4] He shows successfully how far the 'new' psychology can get along didactically without a laboratory. After all the labors at the manipulation of laboratory apparatus for furthering the interests of the science during the last forty years, it is not a little interesting that psychology now and then shows a disposition to get away, as it were, from the laboratory. This author recognizes,

[1] 'Is the Conduction of the Nerve Impulse a Chemical or a Physical Process?' *Journ. of Biol. Chem.*, Oct., 1907.

[2] See PSYCH. BULL., Vol. V., pp. 221 ff.

[3] *L'aphasie de Broca*, 2 vols., Paris, 1908.

[4] *Elementary Experiments in Psychology*, New York, 1908.

through his motto, 'not psychology, but to psychologize,' the special demands for laboratory preparation.

Some of the disputed points in the psychology of temperature sensations have been profitably covered by Alrutz.[1] The recognition of the three grades of cold, warmth and heat is required by the results of reaction-time analysis. The reaction-time to warmth sensation is about twice as long as to either heat or cold sensations. Heat sensations cannot be introspectively analyzed, and must be regarded as simple; at the same time he finds evidence which seems to confirm amply Thunberg's view that the sensation of heat may be produced by the simultaneous stimulation of heat and cold spots. Psychological optics, which has been a field of vigorous inquiry in recent years, has received an important contribution from Dodge.[2] He suggests the need of the new term of 'fixation field' as necessary to specify what occurs in the absence of an absolute fixation. As a substitute for the old theory of local signs he offers the suggestion of a 'genetic organization of the retinal elements' for solving the same problem. Kinæsthetic sensations in bringing the fovea to the stimulation point do not seem to be present, and the coördination of tactile and visual space is to be understood in terms of the compensatory movements of the eye, the head, and the body.

The importance of attention in both psychological theory and practice is to be noted in the special consideration which it has been receiving of late. In his prize essay of three years ago, Roehrich gives special emphasis to spontaneous attention as a too-much neglected beginning of the later and more elaborate conscious processes.[3] The widest and most comprehensive use of the term is given by Pillsbury in the expanded and augmented English edition of his recently published French work.[4] His effort seems to be to effect a reconciliation among the extreme views that are current as to the nature of attention, and leads the author to cover almost the entire range of mental processes. A restricted use of the term and a consistent adherence to the theory of attention as 'sensory clearness' are given in the stimulating review of the situation and discussion of particular problems by Titchener.[5] It is frankly recognized that the 'doctrine of

[1] 'Untersuchungen ueber die Temperatursinne,' *Zt. f. Psych. u. Phys. d. Sinnesorgane, Abt. f. Psych.*, Vol. XLVII., pp. 161, 241.

[2] 'An Experimental Study of Visual Fixation,' PSYCH. REV., *Mon. Supp.*, No. 35, Nov., 1907.

[3] *L'attention spontanée et volontaire*, Paris, 1907.

[4] *Attention*, in the Library of Philosophy, London, 1908.

[5] *Lectures on the Elementary Psychology of Feeling and Attention*, New York, 1908.

attention' is one of the supports in the tripod upon which 'the system of psychology' rests, sensation and affection being the other two. The material of consciousness is regarded as homogeneous. Affections are simply arrested sensations. 'We may attend without feeling, but we cannot feel without attending.' Experimental psychology is credited with the discovery of attention as one of its three principal achievements. "What I mean by the discovery of attention is the explicit formulation of the problem; the recognition of its separate status and fundamental importance; the realization that the doctrine of attention is the nerve of the whole psychological system, and that as men judge of it, so shall they be judged before the general tribunal of psychology." Let us hope that he has succeeded in laying out 'a program of experimental work for the future' which is to be fully executed. The rather classic classification of abnormalities of attention by Ribot is not accepted by Vaschide and Meunier.[1]

Both the physiological and the psychological interests in affective phenomena continue more or less profitable. In opposing the peripheral James-Lange theory of the origin of emotions, Pieron advances a central physiological view of the same problem.[2] Emotion is a mental phenomenon; but, he contends, our knowledge of physiology warrants the belief that it is the caudate nucleus of the striate body which is the true central source. D'Allonnes has given an elaboration of his theory of the visceral origin of emotions.[3] 'Inclinations' are one of the three kinds of sentiments, and are to be regarded as any more or less persistent system of psychological forces. His chief argument seems to rest on the fact that the expressions of emotions are themselves not emotional, and on his contention that inclinations may lose their original emotional *quale* and exist without emotions. Nádeje is presenting a rather vigorous criticism of the old teleological view that pleasure is identical with the useful, and pain with the harmful.[4] The psychological point of view makes it clear that 'the useful' (and 'the harmful') are not causal in any sense, and must, therefore, be rejected as unscientific. Pleasure and pain are qualitative opposites, normal and positive experiences, but neither stimuli nor ends of biological processes. It will be interesting to see the further outcome of the suggestion that these modes of affection are psychologically symptomatic; pleasantness showing a mental process to be

[1] *La pathologie de l'attention*, Paris, 1908.
[2] *Journ. de psych., norm. et path.*, Sept.–Oct., 1907.
[3] *Les inclinations, leur rôle dans la psychologie des sentiments*, Paris, 1908.
[4] *Die biologische Theorie der Lust und Unlust*, Heft I., Leipzig, 1908.

suited for mental assimilation, painfulness indicating it to be unsuited. It would seem that Wundt's tridimensional theory of feeling has exhausted its usefulness without bringing ultimate order into this section of psychology;[1] but Alechsieff valiantly endeavors to test the several theories extant and seems to find further experimental support for the theory.[2]

The higher processes of consciousness have not failed to receive their share of attention, although the exploitation of theories and facts under these topics does not seem as startling or as eventful for the welfare of the science as those concerned with the more elementary processes. The psychology of perception has suggested some renewed efforts at making clear the factors and processes involved. Sidis finds a percept to have a 'nucleus' and 'marginal elements,' the nucleus being the cue to the attendant motor reactions and the center of the affective tone.[3] The marginal elements are not images, but 'secondary sensations.' Read finds perception to be a marked circular activity.[4] "In perception the object holds the eye, but in phantasy the mind's eye has to hold the image. This difference seems to be due to the definite reflex of perception which adjusts the sense-organ and maintains the continuity of the stimulus." In contending that images cannot be separated from perception, Cattell suggests a more functional point of view for justifying the distinction between them.[5] "Perceptions are distinguished from images by the greater prominence of the conative or motor elements." "The character and validity of our perceptions are prescribed more by the motor responses than by the incoming currents." The spread of ability in memory training continues to offer both theoretical and practical problems. Fracker has found that 'individual imagery' is the central factor in both improvement and transference of training.[6] "Improvement seems to depend upon the consistent use of some form of imagery, while the rate of improvement seems to depend directly upon the conscious recognition

[1] Johnston, 'The Feeling Problem in Recent Psychological Controversies,' PSYCH. BULL., V., pp. 65 ff.; Titchener, 'The Tridimensional Theory of Feeling,' *Amer. Journ. of Psych.*, April, 1908.

[2] 'Die Grundformen der Gefühle,' *Phil. Studien*, 1907, pp. 156 f.

[3] 'The Doctrine of Primary and Secondary Sensory Elements,' PSYCH. REV., Jan. and March, 1908, pp. 56 ff.

[4] 'On the Difference between Percepts and Images,' *British Journ. of Psych.*, Oct., 1908.

[5] 'Reactions and Perceptions' in *Essays Philosophical and Psychological in Honor of William James*, New York, 1908.

[6] 'On the Transference of Training in Memory,' PSYCH. REV., *Mon. Supp.*, No. 38, 1908.

of the imagery, and upon attention to its use." He also found evidence in favor of 'a limited spread of training.' Winch's tests upon school children of twelve and thirteen years of age has led him to the definite conclusion that "improvement gained by practice in memorizing one subject of instruction, is tranferred to memory work in other subjects whose nature is certainly diverse from that in which the improvement was gained."[1] The work of Marbe and Messer has been continued by Bühler, and thus additions are made to what might be called the Würzburg School of the thought processes.[2] 'Thoughts' are to be regarded as 'elements,' ultimate terms or units in the higher processes. Of these there are three main types: the consciousness of rule, of relation, and of meaning or intention. 'Wissen' is the most appropriate comprehensive term for these forms of consciousness. Woodworth has protested against the refusal to admit 'the consciousness of relation' to scientific standing.[3] The feeling of relation does not 'readily fit into a sensationalistic classification' of mental facts, and our psychology should be generous enough to recognize it. 'The consciousness of relation is not included in the consciousness of the terms' involved in the relation. The brief but scientific exposition of the so-called Austrian School by Witasek should be mentioned in this connection.[4]

Genetic psychology, which long since found its scientific justification, has come into marked possessions within the period under review. Mention has already been made of the attraction our science has for the evolutionary hypothesis. Within its own private domain, the science has received special enrichment with the appearance of Baldwin's second volume on *Thought and Things*.[5] The reconstructive power of the genetic method is shown even more significantly as it enters in this second installment the region of logic. The abstracted processes usually handed over to formal logic are here made vital and effective for those cognitive interests which first and last have their true valuation in a psychology endeavoring to recognize the totality of consciousness. It is high time that a mechanical sensationalistic psychology as well as the historically rigid logic should be shocked

[1] 'The Transfer of Improvement of Memory in School Children,' *British Journ. of Psych.*, Jan., 1908.

[2] 'Tatsachen und Probleme zu einer Psychologie der Denkvorgänge,' *Arch. f. die gesamte Psych.*, Vol. IX., Heft 4 and Vol. XII., Hefte 2 and 3.

[3] 'The Consciousness of Relation' in *Essays in Honor of W. James.*

[4] *Grundlinien der Psychologie*, Leipzig, 1908.

[5] *Thought and Things, A Study of the Development and Meaning of Thought, or Genetic Logic*, Vol. II.: *Experimental Logic, or Genetic Theory of Thought*, London, 1908.

into an awakening where they may be led to see that consciousness is itself efficient in the progression of objects and meanings. "Thinking is considered in the light of an effective function, working upon the objects of cognition, having adequate motives for its passage from one state to another, and pursuing its characteristic method in achieving each successive stage." Its procedure is 'essentially in the experimental erection of an object already made-up in consciousness and its treatment as having a meaning or value which it has not yet been found to have, with the expectation and intent that in the result it may be found to have it.' A contrasted application of the method of genesis is presented by Mitchell, who seeks 'the direct explanation of mind.'[1] Rejecting the biological view of consciousness, and regarding experience as such as incapable of self-development, he demands that all explanations must be in terms of 'faculties.' Inasmuch as mind grows, it has structure, and the central and fundamental problem becomes, "How are experiences and how is mind (as faculties or dispositions) to be used as causal factors?" Another and even more literal view of the genetic method which transcends the bounds of psychology is employed by Hall, who finds the background to be identical with the evolution of the physical and organic universe.[2] Our minds as a whole as well as specific processes therein are regarded as derivatives of the unconscious antecedents in the evolutionary order of things. Man indeed is but a large lamination of 'perhaps's' which physics, chemistry and biology must sketch into the dim vistas of the past. "The moving equilibrium that pervades animate nature differs from human intelligence in nothing fundamental save that in the former new adjustments to the new influences in the environment are slower in time." Yet another effort at the appreciation of the genetic has been made by Miss Shinn in her summary and interpretation of the facts of mental development first made known by her fifteen years ago.[3] Experimental methods and psychological theory are discredited, for 'child study' must develop 'its own theoretic basis.'

The educational bearings of the science continue to flourish under the leadership of both the experimental and genetic points of view. When a master in psychology, such as Meumann, turns to the practical problems of development and instruction, a hopeful day has ar-

[1] *Structure and Growth of Mind*, London, 1907.

[2] 'A Glance at the Phyletic Background of Genetic Psychology,' *Amer. Journ. of Psych.*, April, 1908.

[3] *Notes on the Development of a Child*, Vol. II.: *The Development of the Senses in the First Three Years of Childhood*, Berkeley, 1908.

rived.[1] Who can fail to see progress when the American 'child study' of years ago migrates to the Continent and comes back as 'experimental pedagogy' for Germany? Meumann may be over-sanguine in his belief that 'experiment is the signature of present pedagogy'; but he has at least for the first time shown us to what extent the method of exact psychology has equipped us with knowledge as to the facts of pupil development and reaction under instruction. Swift has brought to light some new traits of development;[2] and Crampton's suggestion, that 'physiological age should be taken as a basis for all records, investigations, and pedagogical, social or other treatment of children,' may lead us to redraft some of our curves of individual development.[3] 'Orthogenics' is an addition to our vocabulary offered by the *Psychological Clinic* and means 'the science which treats of the restoration of the retardent and the deviate to normality.' The recognition of education as fit for scientific alliance, as instanced by the formation of Section L of the American Association for the Advancement of Science two years ago, is worthy of more than passing note. It remains to be seen whether it means a greater dependence of education on psychology.

As already indicated, animal psychology is growing by leaps and bounds, both as to its technique in terms of apparatus and seizure of problems, and as to the results obtained by experimentation. The discovery of 'educability' as a form of animal behavior has led Hachet-Souplet to suggest *zoopédie* as a term to designate animal education. The credit of both animal and human psychology has measurably appreciated through the rare success of Pfungst in making plain the genuine and complex behavior of *Der kluge Hans*.[4] The explanation which points out that the 'tapping' of the horse in response to questions was really organized by attention to the unconscious 'signalling' of his gentle teacher, becomes an interesting contribution to the psychology of involuntary movements. The motif of functional psychology finds a hopeful application in the current endeavors to secure more thorough knowledge of the sensory and motor data of both the higher and lower animals as the best means of understanding their respective behaviors. At the same time the genetic method may ere long open up to us the 'phyletic background' in so far as it is more readily approachable in terms of the animal mind of to-day.

[1] *Vorlesungen zur Einführung in die experimentelle Pädagogik und ihre psychologische Grundlagen*, 2 vols., Leipzig, 1907.

[2] *Mind in the Making*, New York, 1908.

[3] 'Anatomical or Physiological Age, versus Chronological Age,' *Ped. Sem.*, June, 1908.

[4] *Das Pferd des Herrn von Osten* (*der kluge Hans*), *Ein Beitrag zur experimentellen Tier- und Menschen-Psychologie*, Leipzig, 1907.

There is reason to believe that psychological æsthetics ought to be taken out of the mere 'preference' stage and advanced to the point of more hopeful analysis by the suggestive results of Bullough.[1] The distinction between the merely pleasing or agreeable and the beautiful should be one having psychological interest. In ruling out 'preference' judgments, and correlating the reasons given by the various subjects he brought to light what he calls 'perceptive types,' or the 'individuals who tend to the perception of one aspect or group of aspects (of color), rather than of another.' These types seem to correspond to the four main 'aspects' of color as objective, physiological, associative, and character. We are now able to see clearly that the difference of æsthetic effects are conditioned by the differences in perception of æsthetic elements (so far as colors are concerned), and experimental æsthetics receives an invitation to work over from this point of view the appreciation of other elementary factors in æsthetical consciousness.

Experimental psychology seems to be approachiug the fulfillment of its old promise of signally aiding in the study of mental abnormalities. Jung maintains that the performances of the lunatic are not mere chance results, but that the laws of normal thought have, for example, full application in the mind of a case of dementia precox, the real difference being only one of degree.[2] Dumas would have us believe that there is a difference between pathological psychology and psychiatry, the former being more analytical and scientific, the latter more clinical in character and scope.[3] Wells regards the present methods as more or less defective, and endeavors to secure a more careful organization of the methods of experimentation to psychiatry.[4] Beers has given an unusual enrichment to our descriptive literature by recording his memory of events when suffering from mental disorder, and of the slow process of gradual return to a normal condition.[5]

As a carefully organized selection of publications, the *Psychological Index* continues to be our best measure of the ebb and flow of the psychological currents. This quantitative estimate shows the number of times psychologists and their colleagues in the related sciences have

[1] 'The Perceptive Problem in the Æsthetic Appreciation of Single Colours,' *British Journ. of Psych.*, Oct., 1908.

[2] *Ueber die Psychologie der Dementia Praecox*, Halle, 1907.

[3] 'Qu'est-ce que la psychologie pathologique?' *Journ. de psych. norm. et path.*, Jan.–Feb., 1908.

[4] 'Technical Aspects of Experimental Psychopathology,' *Amer. Journ. of Insanity*, Vol. LXIV., 1908.

[5] *A Mind that Found Itself: An Autobiography*, New York, 1908.

written on the various psychological topics. The individual variation is lost sight of, to be sure; but for our immediate needs it is irrelevant as to who the psychologist may be that discusses this or that topic. The output of 1907 is compared with that of 1906 in the following table. The rise of the genetic and allied topics to first rank is the most interesting change to be noted. The falling off under affection is striking. The philosophical implications of psychology show the greatest increase, and the anatomy and physiology of the nervous system shows the greatest decrease in the number of titles last year.

1906.		1907.	
No. of Titles.	Rubric.	No. of Titles.	Rubric.
600	Sleep, trance and pathology.	641	Genetic, individual and social psychology.
572	Genetic, individual and social psychology.	605	Philosophical implications of psychology.
518	Philosophical implications of psychology.	507	Sleep, trance and pathology.
383	Sensation.	465	Sensation.
344	Anatomy and physiology of the nervous system.	217	Anatomy and physiology of the nervous system.
275	General.	185	General.
163	Conation and movement.	143	Cognition.
158	Cognition.	142	Conation and movement.
69	Conditions and relations of consciousness.	68	Conditions and relations of consciousness.
63	Affection.	24	Affection.
3,145		2,997	

The welfare of our science as a university subject in American institutions continues to be most excellent. This year twenty-three maturing dissertations in seven universities merited the doctorate.[1] This number is more than twice as many as were conferred last year, and almost twice as many as the average (13.4) for the ten years previous. It is also interesting to observe that of all the degrees granted among the twenty sciences recorded in these lists during the past eleven years, psychology is credited with over eleven per cent.

On the side of organization and publication the year has been marked by less activity than has been usual of late. Bechterew is to have the direction of the new psycho-neurological institute which was opened at St. Petersburg. The enlargement and reorganization of laboratory facilities at the University of Chicago are significant far more than locally for the integrity of research in both human and animal psychology. *La Revue Psychologique*, edited by Mlle. Ioteyko, is the

[1] 'Doctorates Conferred by American Universities,' *Science*, Sept. 18, 1908.

one new journal which has come to grace the shelves. It is to be a repository for the work in the psycho-physiological laboratory of the University of Brussels, and is dedicated to 'the progress of psychology' in all its departments. The science will, no doubt, come in for a measurable share of space in the *Rivista Pedagogica* which appeared in Rome at the beginning of the year, and especially in the *Sociological Review* which replaces the *Papers* of the Sociological Society of England.

The collection of *Essays Philosophical and Psychological in Honor of William James* by nineteen present and former members of Columbia University is a unique contribution to our literature.[1] In a personal way it is a very unusual honor, being designed as a recognition of his *Principles* as 'the foundation of modern psychology'; and one third of the papers are devoted to psychological topics. From an institutional point of view it might be called the Columbia contribution to 'sound pragmatism.'

[1] New York, 1908.

PSYCHOLOGICAL LITERATURE.

ETHICS.

Ethics. JOHN DEWEY and JAMES H. TUFTS. New York, Henry Holt and Company, 1908. Pp. xiii + 618.

The appearance of this volume in the American Science Series, already so widely and so favorably known, is a matter for congratulation to authors, to publishers, and to the educational and philosophical public. That the book is well worthy to take its place beside James's *Psychology*, Remsen's *Chemistry* and Chamberlin and Salisbury's *Geology*, is what should be expected from the fact that the book was written by its authors. That it will satisfy every teacher in ethics is of course more than any one could hope. There are too many different views still current in the field of ethics to make it possible for any one to write a book now that shall meet the demands of the various teachers of the discipline. But in such a subject as this a text-book has another mission than that of presenting a generally accepted doctrine. It should present the important and typical concrete facts on which all ethical theory must ultimately rest; it should accompany these facts with some well worked out theory which is shown to be a reasonable outcome of scientific reflection upon these facts; and it should give both facts and theory in a form which is suited to the apprehension of those who are beginning to take up the study of the subject. Besides, it should be written in a manner to awaken interest, and as the matter treated is one which bears so directly upon the practical life of every member of society, the interest so awakened should be a personal interest in the practical application of the acquired insight to the actual problems that stare one in the face. The volume before us admirably meets all these requirements. The specialist may differ from the authors on matter of theory, but he cannot fail to recognize that the subject is handled in a scientific spirit and is made to appeal to the reader as a matter of vital interest to him. But the book is not merely a text-book. It is too original to be just that. It deserves to rank among the systematic treatises which every advanced student of the science must reckon with. Even the 'general reader,' who is not seeking entertainment but enlightenment on the ethical aspect of economic, political and social questions, will be repaid by making

more than a casual acquaintance with the volume. It deals largely with the moral problems of our own day and our own country, but it does not prescribe any rules for the removal of our social ills. It rather directs attention to the spirit in which the problems should be attacked if in the course of time reasonable solutions are to be found.

However, it is with the book as a text-book and a scientific treatise that this review shall deal. The volume is somewhat larger than the ordinary run of manuals of ethics. It is about half as large again as Mackenzie's popular handbook, which it will probably find to be its leading competitor. It contains enough matter to occupy a class very fully for a half-year, three hours a week; but with judicious selection of topics it could very profitably be used in much shorter courses. The references to the literature of the subject are copious but not overwhelming. The arrangement of the material is convenient: following an introduction which deals with the definition, the method, and the divisions of ethics, and with the criterion of the moral, there are three parts. Part I. is devoted to 'The Beginnings and Growth of Morality'; part II. to the 'Theory of the Moral Life'; and part III. to 'The World of Action.' Thus the theory of ethics is developed after an historical survey of characteristic periods of moral life in the past, and is introductory to the treatment of specific moral problems of the present.

Part I. was written by Professor Tufts, part II. by Professor Dewey, and part III. is divided between them, Professor Dewey having written the first two chapters, Professor Tufts the remaining five. But each author 'has contributed suggestions and criticisms to the work of the other in sufficient degree to make the book throughout a joint work.'

The account given in part I. of the beginnings and growth of morality is clear, concise and comprehensive. In general the work of gathering together the pertinent facts and presenting them in a manner that makes them easily grasped has been very ably done. There are some points, however, which call for comment.

Professor Tufts differentiates three levels of conduct: "(1) Conduct arising from instincts and fundamental needs. To satisfy these needs certain conduct is necessary, and this in itself involves ways of acting which are more or less rational and social. The conduct may be *in accordance with* moral laws, though not directed by moral judgments. We consider this level in the present chapter. (2) Conduct regulated by *standards of society*, for some more or less conscious end involving the social welfare. The level of custom, which is treated in Chapter IV. (3) Conduct regulated by a standard which is both social

and rational, which is examined and criticized. The level of conscience." "The motives in these levels will show a similar scale. In (1) the motives are external to the end gained. The man seeks food, or position, or glory, or sex gratification; he is forced to practice sobriety, industry, courage, gentleness. In (2) the motive is to seek some good which is social, but the man acts for the group mainly because he is *of* the group, and does not conceive his own good as distinct from that of the group. His acts are only in part guided by intelligence; they are in part due to habit or accident. (3) In full morality a man not only intends his acts definitely, he also values them as what he can do 'with all his heart.' He does them *because* they are right and good. He chooses them freely and intelligently. Our study of moral development will consider successively these three levels. They all exist in present morality. Only the first two are found in savage life. If (1) existed alone it was before the group life, which is our starting-point in this study" (pp. 38–39). Apart from the very questionable statement that 'savage life' does not exhibit any evidence of the third level, and from the seeming implication that there was a human period 'before the group life,' we may all accept this doctrine of the three levels of conduct. But when in an historical treatment of the beginnings and growth of morality, these three levels are treated successively, it may be difficult for the student to understand that the first level is not an historical level at all, when the other two levels are expressively recognized as historical. Pedagogically therefore I should have considered it much better to recognize only two levels, the level of custom and the level of conscience, if it is to be called that. The instinctive tendencies of the individual which find expression in group morality but which are controlled by group standards, should, I think, have been treated under the head of 'group morality,' along with 'the means which society uses' to 'elevate men and knit them together' (p. 51). Then it would have been easier to show how the level of 'conscience' was reached by the gradually emerging tension between the instincts controlled and the means used for their control — a tension which demanded for its removal a new means of control, or rather an integration of a new element or of new elements into the old means of control. This method would have seemed to be more in accordance with the treatment which is given of the growth of morality after the third chapter, which deals with 'the first level.'

Group morality is described in its more salient features, and it would be hard to get a better description which is equally brief and incisive. The development of the morality of conscience out of group

morality is illustrated by tracing the process in the case of the Hebrews and of the Greeks. These two peoples are chosen for this purpose because they offer characteristic differences in their mode of development. But it seems that these differences are over-emphasized, at least in certain points. Thus we are told that if "we distinguish in conscience two aspects, thoughtfulness in discovering what to do and hearty desire to do the right when found, then the Greeks emphasize the former, the Hebrews the latter. Intellect plays a larger part with the Greek; emotion and the voluntary aspect of will with the Hebrew. Feeling plays its part with the Greeks largely as an æsthetic demand for measure and harmony; with the Hebrews it is chiefly prominent in motivation, where it is an element in what is called 'the heart,' or it functions in appreciation of acts performed, as the joy or sorrow felt when God approves or condemns" (pp. 91–92). The 'wisdom literature' of the Hebrews shows us that at least a considerable number of the thinkers of that people exhibited thoughtfulness in discovering what to do, while the accounts we have of Socrates and the writings we have of Plato and Aristotle show on the contrary that these men had as hearty desire to do the right when found as perhaps any Hebrew ever displayed. Feeling as prominent in motivation could scarcely be more emphasized than it was by Plato when he made love for ideal types the highest and purest motive to right living. Nor did Aristotle seem to be deficient in ecstatic enthusiasm, and surely he showed in his acute analysis of will, which must have been the will he found among the Greeks, that the part played by feeling in motivation was as prominent in the Greek as in the Hebrew. The Cyrenaics and the Epicureans are witnesses to the same fact. This exaggeration of contrasts is only one of several such. But while the treatment is thus to a certain extent marred by excessive antitheses, the general impression it leaves is without doubt on the whole correct.

The section of this first part which deals with the mediæval and modern periods is quite brief, less than thirty pages being given to them; but this is not disproportionate, when we consider that the modern age is treated more in detail in part III. It is characteristic of the spirit of the whole work that of the thirty pages devoted to this subject here, ten are given to the discussion of industry, commerce and art in their influence on moral conceptions, without in the least suggesting that the moral is thereby materialized. On the contrary the economic life is shown to be progressively moralized, and the problems in this process of moralization are presented in clear form; and they are shown to be all at bottom the single problem of securing for every

member of society the social use of all that civilization produces (p. 192).

Part II., on the theory of the moral life, occupies a little more than a third of the book, extending from page 201 to page 425. The method adopted is a combination of criticism of previous theories with independent analysis of typical moral situations. The critical work is exemplary; it is searching and keen, but not disparaging; it seeks to ascertain the truth for which the theory criticized stands, as well as to discover the points on which the theory fails to do full justice to the facts. The result is that almost every criticism is a thoughtful appreciation of the author studied. The theory which Professor Dewey himself presents in the book is perhaps closest to Mill's utilitarianism and to Green's self-realizationism. It differs from the former in embodying the results of better psychological analysis; it differs from the latter in that the metaphysical foundations which Green thought he had to lay for his ethics are removed, and the theory thus becomes a scientific instead of a metaphysical theory of ethics. But while these affiliations are the most striking, they are not the only ones. Professor Dewey's ethical theory is rather a critical synthesis of practically all the previous historical theories.

The definition of morality is given in these words: "Conduct as moral may be thus defined as *activity called forth and directed by ideas of value or worth, where the values concerned are so mutually incompatible as to require consideration and selection before an overt action is entered upon*" (p. 209). The moral thus has a place between merely instinctive or habitual or customary action on the one hand, and a type of habitual action on the other which results from reflective choices in the past. But the moral is never permanently left behind. "Every act is *potential* subject-matter of moral judgment, for it strengthens or weakens some habit which influences whole classes of judgments" (p. 211). The best outcome of deliberation and reflection and of actions performed under their control is not the formation of general rules of behavior, but the adoption of general principles. "*Rules are practical; they are habitual ways of doing things. But principles are intellectual; they are useful methods of judging things.*" The "*object of moral principles is to supply standpoints and methods which will enable the individual to make for himself an analysis of the elements of good and evil in the particular situation in which he finds himself*" (p. 333).

The deliberation which thus distinguishes the moral from the customary action is "a process of active, suppressed, rehearsal; of

imaginative dramatic performance of various deeds carrying to their appropriate issues the various tendencies which we feel stirring within us. When we see in imagination this or that change brought about, there is a direct sense of the amount and kind of worth which attaches to it, as real and as direct, if not as strong, as if the act were really performed and its consequence really brought home to us" (pp. 322–3). "It is this direct sense of value, not the consciousness of general rules or ultimate goals, which finally determines the worth of the act to the agent. Here is the inexpugnable element of truth in the intuitional theory. Its error lies in conceiving this immediate response of appreciation as if it excluded reflection instead of following directly upon its heels" (p. 323). Thus deliberation is not a *purely* intellectual process. "We have had repeated occasion . . . to see how artificial is the separation of emotion and thought from one another. As the only effective thought is one fused by emotion into a dominant interest, so the only truly general, the reasonable as distinct from the merely shrewd or clever thought, is the *generous* thought. Sympathy widens our interest in consequences and leads us to take into account such results as affect the welfare of others; it aids us to count and weigh these consequences as counting for as much as those which touch our own honor, purse, or power. . . . It translates the formal and empty reason of Kant out of its abstract and theoretic character, just as it carries the cold calculations of utilitarianism into recognition of the common good" (pp. 334–5).

But what is the good, and what the common good? Of course it is happiness, but what is happiness? Our ends are our happiness, not a means to it (p. 273). "All men love happiness — yes, in the sense that, having desires, they are interested in the objects in which the desires may be realized, no matter whether they are worthy or degraded. No; if by this be meant that happiness is something other than and beyond the conditions in which the powers of the person are brought out, and made effective; no, or if it means that all love that which really will bring happiness" (p. 274). "Not all anticipations when realized are what they were expected to be. . . . While they appeared to be happiness during the expectancy of desire, they are not approved as such in later reflection. Hence the demand for some standard good or happiness by which the individual may regulate the formation of his desires and purposes so that the present and the permanent good, the good in desire and in reflection, will coincide — so that the individual will find that to be satisfactory in his present view which will also permanently satisfy him. From happiness as a con-

ceived good we turn to happiness as *rightly* conceived good; from happiness as result to happiness as standard" (pp. 274–5). If we appeal to present valuation to settle the question we must take the valuation of good men. "Only upon the supposition that character is already good can we trust judgment, first, to foresee all the consequences that should be foreseen ; and, secondly, to respond to each foreseen consequence with the right emotional stamp of like and dislike, pleasure and pain" (p. 279). This at first blush looks like a circular procedure, but Professor Dewey does not remain in the circle. There is a formal characteristic by which true good can be identified. "Harmony, reënforcement, expansion are the signs of a true or moral satisfaction" (p. 284). The question as to the true good, the standard happiness, then becomes this: "What is the good which while good in direct enjoyment also brings with it fuller and more continuous life?" (p. 284). The answer is: "In substance, the only end which fulfills these conditions is the social good. The utilitarian standard is social consequences" (p. 286). This standard defines the good man: "The genuinely moral person is one, then, in whom the habit of regarding all capacities and habits of self from the social standpoint is formed and active. Such an one forms his plans, regulates his desires, and hence performs his acts with reference to the effect they have upon the social groups of which he is a part. He is one whose dominant attitudes and interests are bound up with associated activities. Accordingly he will find his happiness or satisfaction in the promotion of these activities irrespective of the particular pains and pleasures that accrue" (p. 298).

When later in the book the problem of equating personal and general happiness arises, it is declared insoluble because it is artificial. "It assumes a ready-made self and hence a ready-made type of satisfaction of [or?] happiness. It is not the business of moral theory to demonstrate the existence of mathematical equations, in this life or another one, between goodness and virtue. It is the business of men to develop such capacities and desires, such selves as render them capable of finding their own satisfaction, their invaluable value, in fulfilling the demands which grow out of their associated life. Such happiness may be short in duration and slight in bulk; but that it outweighs in quality all accompanying discomforts as well as all enjoyments which might have been missed by not doing something else, is attested by the simple fact that men do consciously choose it. [Do not men consciously choose other ends as well, and would not this prove the contradictory thesis?] Such a person has found *himself*,

and has solved the problem in the only place and in the only way in which it can be solved: *in action.* To demand in advance of voluntary desire and deliberate choice that it be demonstrated that an individual shall get happiness in the measure of the rightness of his act, is to demand the obliteration of the essential factor in morality: the constant discovery, formation, and reformation of the self in the ends which an individual is called upon to sustain and develop in virtue of his membership in a social whole. . . . Our final word about the place of the self in the moral life, is, then, that the problem of morality is the formation, out of the body of original instinctive impulses which compose the natural self, of a voluntary self in which socialized desires and affections are dominant, and in which the last and controlling principle of deliberation is the love of the objects which will make this transformation possible. If we identify, as we must do, the interests of such a character with the virtues, we may say with Spinoza that happiness is not the reward of virtue, but is virtue itself" (pp. 396–7).

It does not fall within the scope of this review to examine in detail the adequacy of this general theory. If the reviewer says, as he feels inclined to say, that the treatment fails to do full justice to one important side of morality, he can merely indicate what he means. The demands which others make of us, though they play a most important part in the actual moral situations that confront us all, are passed over too lightly. The ideal self which meets these demands in the proper spirit is admirably described in some of its aspects. But in the moral life a person is continually engaged in a social process of give and take, and this process is very complex. One phase of this process is his giving expression to his ideals as they apply to *others*, and his reception of the application of others' ideals by these others to himself. This is worked out in part I. by Professor Tufts in his description of group morality, but in part II. custom *as the embodiment of social demands* is made to retire too complaisantly, giving way to deliberation and to the social habits that arise from deliberative actions. The new custom that replaces the old custom is thus represented as too much the result of the person's deliberation and too little as still determined by social demands. If this side of morality were brought more to the fore, the ideal self which is depicted in these pages would be shown to have a powerful ally in the process of its own realization which now it seems to lack; or the presence of which at least is not adequately recognized.

Part III. deals with 'Social Organization and the Individual,'

'Civil Society and the Political State,' 'The Ethics of the Economic Life,' 'Some Principles in the Economic Order,' 'Unsettled Problems in the Economic Order' (two chapters), and finally 'The Family.' The discussion of the various problems thus handled is preceded by a short statement of the historical development of present-day conditions which give rise to these problems. This third part makes the volume perhaps the most practical of all the ethical text-books in our language.

The publishers have done their fair share to the production of a high-grade book. The print is open and sufficiently large, the paper light and strong, and the binding is uniform with that of the series. The proof reading has been carefully done, but still there are a few mistakes, typographical and otherwise, which remain, *e. g.*, 'bound' for 'bond,' p. 32, l. 29; 'Erinnys' for 'Erinnyes,' p. 122, l. 15; 'Philip' for 'Alexander,' p. 126, l. 17; the transposition of 'motive' and 'intention,' p. 256, l. 12; and 'of' for 'or,' p. 396, l. 5. There is an index of twelve pages.

I cannot close the review of such a book as this without expressing my admiration of the way in which the authors have accomplished their task.

EVANDER BRADLEY MCGILVARY.

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VISION.

Stereoscopic Vision and its Relation to Intensity and Quality of Light Sensation. T. R. ROBINSON. University of Toronto Studies, Psychological Series, pp. 45 + 78, with 15 plates. (Serial number and date of publication not indicated.)

The author of this paper undertakes to contribute to the solution of the following problems: Under what conditions may pairs of images combine stereoscopically when they differ (*a*) in color and (*b*) in brightness? As was to be expected in such an investigation, the phenomena of luster as well as those of relief come in for consideration throughout.

The apparatus was a modified form of the stereoscope, and a set of stereograms. The stereograms consisted of various gray and colored surfaces, together with geometric figures in black, in white and in color. An episcotister was employed for the purpose of varying the conditions of presentation on one half of the stereogram. A final modification of the procedure consisted in reporting what changes occur when objects are observed through colored spectacles. The author has been at work upon this general problem, at intervals, for a decade or more. The essential features of his findings to date are as follows:

The first beginnings of stereoscopic combination occur under conditions which are widely different from those which are required for the production of the 'complete stereoscopic effect.' The episcotister experiments show that the minimal degree of brightness at which the darkened half of the stereogram is able to contribute to the perception of relief is surprisingly small. Moreover, this minimal brightness of the darkened image varies with the absolute luminosity of its non-darkened mate. Thus, with intense illumination a 'partial stereoscopic effect' appears when one image is still one thousandfold brighter than its counterpart; while a ratio of one to one hundred is adequate for the complete stereoscopic effect. With a lesser illumination, however, the luminosity of the two images must be brought into the relation of one to five (or even of one to three) in order to produce the partial effect; and if the complete effect is to be obtained the difference in brightness must be still farther reduced — to about fifty per cent. For the production of even a partial luster, one image must be from one and a half to three times as bright as its counterpart. And if the two surfaces differ by more than nineteen hundredfold no luster appears. The relations of brightness within which perfect luster appears vary between a lower limit of one to ten, and an upper limit of one to nine hundred.

In his investigation of the binocular combination of colors the author employed twelve color stimuli whose luminosities he equated roughly (his method of photometry, however [II., p. 29], does not inspire confidence in his results); and each color was presented in combination with every other color twenty times. It was found that complete rivalry occurred in fourteen per cent. of the cases, partial rivalry in thirty per cent., inconstant mixture in sixteen per cent., and complete mixture in forty per cent.— the proportion of cases of mixture being unexpectedly great. In the experiments with different colors extending over the whole monocular field (colored spectacles) luster was frequently observed, while rivalry was never prominent. The colors observed seemed vague and indefinite; and attempts to describe the colors of the glasses were seldom successful.

Robinson's monograph fails to carry conviction — chiefly because the author's method lacks refinement, and his observers were, in most instances, too few in number to warrant a general statement of results. It is evident, too, that the author has failed to master the literature of his subject.

J. W. Baird.

University of Illinois.

Die Abhängigkeit der Lichtempfindlichkeit von der Flächengrösse des Reizobjektes unter den Bedingungen des Tagessehens und des Dämmerungsehens. K. HENIUS. Zsch. f. Sinnesphysiol., 1908, XLIII., 2, 99–122.

The experimenter seeks to know the relation of the sensitivity of the retina to light to the area of surface stimulated for pure twilight and for pure day vision. His main purpose is to find out whether the periphery in day vision has the same relation between sensitivity and area of stimulation as the fovea centralis. Riccò had discovered the law that the sensitivity of the fovea is proportional to the area of the retinal image and the light intensity, while Piper had shown that for the periphery much depends upon the state of adaptation. Experimenter wishes to test the latter observations and also to find out what happens when the rods alone and the cones alone are functioning.

Nagel's adaptometer was provided with an iris shutter before the front milk-glass, thus giving a stimulating surface of variable area and intensity. The change in area was also produced by changing the distance of observer from adaptometer. When red light was wished a red glass was interposed which transmitted only red rays, and for bluish-green a liquid which transmitted only bluish-green rays. For the peripheral vision a point 10° above the fovea was taken, this being done by having fixation point 10° above the stimulating light. Light and dark adaptation were both arranged for in the room, light by gazing at a white pasteboard illuminated by a cluster of electric lights and dark by completely darkening the room. To get the judgments, then, observer, properly adapted, would take his position and fixate the point 10° above the stimulating surface and state whether he could see this or not.

From tables of many experiments and curves plotted from them, the following are the most important conclusions:

For the dark-adapted retinal periphery, with white light, Piper's rule that Light intensity $\times \sqrt{\text{Area stimulated}} = \text{Constant}$ is valid for all angles between 1° and 10°. For greater angles there is not so great a dependence of intensity upon the area.

Under the same conditions, with red light, the law does not hold (a result that is natural enough).

Also for green light there is a great deviation from the law (a fact which is not so easily explained).

For the light-adapted retinal periphery, for all three lights, Riccò's law (light intensity × area stimulated = constant) which holds for the fovea, is invalid for surfaces of 10° and more. For less than 10°

there is some dependence of the sensitivity upon the surface stimulated but not as much as required by the law. For areas equal to or less than the foveal area whether the law holds or not cannot be made out from the experiments, so that it is not yet sure whether there is a difference in function here between the cones of the fovea and those of the periphery.

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HEARING.

Die Zeitschwellen für Stimmgabeltöne mittler und leiser Intensität. RUDOLF BODE. Psychol. Studien, 1907, II., 293–323.

The author used four electromagnetic tuning forks of 128, 256, 384, and 512 vibrations. The tones were conducted through a tube from the room in which they were produced to a third room. The duration was controlled through a specially constructed valve opened for a definite time. In order to get tones as simple as possible the overtones were weakened by means of wave interference. The intensity of the tones heard at the end of the conducting tube was controlled by cutting an opening in this tube near the fork and closing the opening less or more or entirely by means of a sliding tube. The author states that this method of controlling the intensity was not very satisfactory because very small movements of the sliding tube caused very great changes in the tone intensity.

Tones of different pitch were regarded as equally strong when they appeared equally strong to the subject, since there is no objective method of comparing the intensities of tones of different frequencies.

The experiments were conducted in the following way: The tone was given ten or more times, each time with a slightly greater duration. The subject recorded what he perceived in each case. The following is a comprehensive statement of these records:

1. Weak tones need a longer stimulus and a greater number of vibrations passing through the valve than strong tones of the same pitch in order to be clearly perceived.

2. High tones need only a shorter stimulus, but more vibrations passing through the valve than low tones in order to be clearly perceived.

3. The change from higher to lower tones mentioned under (2) is more pronounced in the lower than the middle region.

4. When the stimulus was too short for a clear perception of tone, various kinds of noises were heard. The author believes that

these noises must be regarded as subjective, that it is the nature of our organ of hearing to mediate the perception of noise when the stimulus is too short for tone perception. (The reviewer has not been convinced on this point by the author.)

The appearance of the article is somewhat marred by values giving the vibration rates in too many decimals, for instance, '12.1088 vibrations' on page 315. This giving of more decimals than correspond to the accuracy of measurement is unfortunately not quite rare in psychological publications and tends to make psychology the laughing stock of the other sciences. The author must have thought (more likely he did not think at all) that each time that he applied the arithmetical operation of dividing to the frequency of the tuning fork, he increased the accuracy with which that frequency had originally been measured, up to one further decimal.

Die Methode der mehrfachen Fälle im Gebiete der Schallempfindungen und ihre Beziehung zur Methode der Minimaländerungen. HANS KELLER. Psychol. Studien, 1907, III., 49–89.

The present paper is chiefly an investigation of the distribution of the judgments concerning the intensity of two successive sounds. The sound was produced by means of an ivory ball falling on an ebony board. The judgments asked for were the following five: equal, more, less, clearly more, clearly less. Finally, some experiments were made to determine the threshold of discrimination according to the method of minimal changes.

The author concludes that the methods of computation recommended by G. F. Lipps and by G. E. Müller lead to similar results, but that the method of Lipps is preferable because it is less dependent on the number of cases. He concludes further that the Gauss law of distribution (error curve) does not hold good in psychophysics.

The threshold derived from the distribution of the equal judgments varied for different subjects from 1 : 11 to 1 : 14. Derived from the less and more judgments it varied from 1 : 8 to 1 : 11. The experiments of the method of minimal changes gave a threshold of from 1 : 8 to 1 : 10. That these values indicate a much smaller threshold than that found by other investigators, is attributed by the author to his improved technic, eliminating some of the disturbances with which previous investigators had to contend. The method of five classes of judgments employed is regarded by the author as establishing a relation between the methods of minimal changes and of right and wrong cases.

Weber's law seems to hold good.

In one respect the reviewer feels strongly inclined to criticize the author's reasoning, namely, with respect to his conclusion that Gauss's law does not apply either to the results of his experiments or to psychophysics in general. In order to prove this he points to such series as these:

3, 3, 1, 4, 3, 1; or
6, 10, 8, 8, 10, 6, 4.

One can scarcely expect a total number of fifteen judgments to be distributed according to Gauss's law. Even the second series of a total of fifty-two judgments does not allow any conclusion either in the affirmative or in the negative. The number of judgments is far too small to draw any conclusion in experiments where the disturbing factors are considerable and where the subjects had so little practice. In ordinary life we scarcely compare the intensity of noises; and the practice acquired in the experiments cannot have amounted to much. It is clear, however, that without considerable practice the subject cannot be expected to possess a firmly established subjective scale of the steps 'equal — different' and 'different — clearly different.' In astronomical observations, where the conditions are much more favorable, Gauss's law has been found to apply with considerable accuracy, even where the steps are, not two as here, but four, as in Argelander's Stufenschätzungsmethode[1] (called also method of sequences). If Gauss's law holds good in photometry, where the practice of ordinary life is highly developed, and in experiments made under the favorable conditions of the astronomical observatory, it seems to be somewhat rash on the author's part to conclude from technically rather imperfect work on the estimation of sound intensities that Gauss's law is not applicable to psychophysics. If the judgments had been a hundred times as numerous as they were, Gauss's law would probably have been found to apply to them.

MAX MEYER.

UNIVERSITY OF MISSOURI.

PSYCHOPHYSICS.

The Method of 'Right and Wrong Cases' ('Constant Stimuli') without Gauss's Formulæ. C. SPEARMAN. British Journal of Psychology, 1908, II., 227–242.

The author proposes to determine the actual distribution of the threshold from the experimental data. He derives for this purpose a

[1] See G. Müller, *Die Photometrie der Gestirne*, p. 459; and A. W. Roberts in the *Astrophysical Journal*, IV., p. 184, 1896.

table of the distribution of the threshold and shows how the average threshold and the accuracy of its determination can be found. The necessary formulæ are given as well for equidistant as for non-equidistant comparison stimuli.

Our fundamental criticism of the method proposed by Spearman is this: The method of constant stimuli can be properly understood only in connection with the method of just perceptible differences, and the result which the author derives is not the one which would be obtained by that method. It is interesting to notice that this paper was written with a full knowledge of the ideas of Müller, who maintains the correct view about the method of just perceptible differences but does not prove it. The fact that the author did propose his method shows how little confidence Müller's unsupported statement inspired.

It was shown lately that the notion of a threshold is superfluous and that the so-called law of the distribution of the threshold can be replaced by the simpler notion of the 'psychometric function.' This is borne out by Spearman's method in a peculiar way. The essential feature of his method is the attempt to characterize a 'Kollektivgegenstand' by one quantity. This can give only an approximation, and a complete characterization could be obtained only by more elaborate methods, among which we mention the one worked out by Bruns. In applying this method one would have to form certain sums which lead back exactly to those data from which the author derived his table of distribution from which one determines the 'Summenfunktion' which is the psychometric function. This shows that the notion of the psychometric functions is more primitive than that of the law of the distribution of the threshold, just in the same way as the notion of the probabilities of the different judgments is simpler than that of the threshold.

Zur Psychologie der Sinne. J. v. KRIES. Nagel's Handbuch der Physiologie des Menschen, Vol. III., 1905, pp. 16–29.

Physiology of the senses deals not only with sensations but also with more complex states of consciousness (sense perceptions) which contain certain elements besides sensation. These phenomena, which belong to the realm of psychophysics, are similar for the different senses, so that it seems advisable to describe them in a general way before entering into the special study of the different senses. We have to mention in the first place the temporal and spatial sensations. The expressions 'time-sense' and 'space-sense' do not designate separate functions, as the name seems to indicate, but complexes of different

functions. We meet, furthermore, in the study of all the senses with certain problems which refer to the determination of the maximum and of the minimum stimulation and of the accuracy of sense perception, *i. e.*, the ability to recognize and to discriminate differences. The author emphasizes the distinction between generic and specific threshold. The stimulus below which a sense organ gives no sensation at all is the generic threshold. That intensity beyond which not only the presence but also other qualities of the stimulus are perceived (*e. g.*, color in light, pitch in sound) is called the specific threshold. This distinction is fundamental and ought to be made also for the threshold of difference, although the two values may or may not coincide as the case may be. The author then mentions Fechner's three methods of psychophysical measurement and gives his views on Weber's Law, which are known from a previous publication. The discussion of the use of specific comparison for the purpose of psychological and physiological analysis is of great interest. Similarity is defined by some writers as partial identity and, if the hypothesis is made that every simple psychical process must have a simple physiological process as its accompaniment, one may try to analyze processes into their elements. This conclusion is not admissible, because simple sensations may be made the object of specific comparison and one would obtain an analysis of processes which are supposed to be simple.

F. M. URBAN.

UNIVERSITY OF PENNSYLVANIA.

FATIGUE.

The Problem of Fatigue. WILLIAM H. BURNHAM. Amer. Journal of Psychol., 1908, XIX., 385–399.

Burnham here gives an admirable statement of the great complexity of the fatigue problem. The problem is indefinitely complicated by all sorts of factors, such as physiological age, race, sex, food, sleep, temperature, light, air, seasonal variations, meteorological conditions, manner of breathing, neuræsthenic conditions, change of work, habituation, practice, warming up, toxic fatigue products, acquired immunity to fatigue poisons by habituation (the theory of antigens and anti-bodies), the tapping of deeper levels of energy, or the liberating of new and unused stores of energy by vigorous exertion or 'explosion' of nervous energy, etc. These factors, in turn, may be very complex. Muscular training, *e. g.*, is not merely a process of modifying and increasing muscular tissue but of immunization to

fatigue. The chief cause of fatigue is toxic products (Mosso). These Weichardt has found normally produce their own anti-bodies which act as antitoxins and thus overcome the fatigue. Moderate injections of the toxin produce the immunity also. Immunity to mental fatigue may result from habituation to work. Likewise the problem of tapping the deeper strata of energy involves consideration of questions of immunity, mental and physical adaptation and nutrition.

The author inclines to the opinion that mental fatigue is general and not localized, and hence that change of work does not produce rest but only lessens the feeling of ennui incident to prolonged effort along one line. He finds the seat of fatigue mainly in the peripheral nervous system. The practical schoolroom questions growing out of the problem are innumerable, but have not yet been adequately solved. Burnham carries James' conception of different levels and reservoirs of energy still farther into the region of hypothesis: possibly this is the most slippery part of the paper.

A Neglected Measure of Fatigue. FREDERICK LYMAN WELLS. Amer. Journal of Psychol., 1908, XIX., 345–358.

This is a critical review of methods used in studying fatigue, and a sketch of results. The methods fall into two groups: those employing repeated voluntary movements at maximal rates, and certain psychological measurements. In the former the subjects tap upon telegraph keys, or plates, or move one of their bodily members over a determined area, or pull a given weight, and the results are recorded by means of counters, graphic recorders or air transmission devices. With the ergograph or myograph the speed problem, however, is complicated by a second factor, namely, that of the energy required to overcome a physical weight. The psychological measurements referred to are the well-known cutaneous, addition, memory, 'unconscious word,' and also Wells' 'A' test. The author would have done well to have more fully detailed the salient features of the latter test. Practically all of these tests reveal the fatigue phenomena, but establish little with regard to practice.

Wells lays down certain essentials of fatigue tests, in the light of which the methods used are critically examined: first, the tests should make a minimum demand on the 'conscious coöperativeness' of the subject, as this introduces a new variable. Second, they should reveal the fatigue effects as early as possible, to avoid the growing feeling of annoyance. Third, they should be precise, especially in respect to recording the occurrences between the initial and final

operations. Fourth, they should measure neural fatigue instead of merely muscular. In the light of these requirements Wells finds that the tests which measure maximally repeated voluntary innervations are superior: the fatigue results appear early (within thirty seconds); the sensations of fatigue exercise a minimal influence; they reveal fatigue of neural origin; and they are fully as accurate as the ergograph measurements, but require less coöperation.

J. E. W. WALLIN.

NORMAL TRAINING SCHOOL,
CLEVELAND, O.

BOOKS RECEIVED FROM DECEMBER 5, 1908, TO JANUARY 5, 1909.

Les principales Théories de la Logique contemporain. P. HERMANT and A. VAN DE WAELE. Paris, Alcan, 1909 (for 1908). Pp. 302. 5 fr.

Essai sur le Système psychologique d'Auguste Comte. A. GEORGES. Lyons, Rey et Cie., 1908. Pp. 63.

An Experimental Study of Sleep. BORIS SIDIS. Boston, Badger, 1909 (for 1908). Pp. iv + 106.

Ueber das Sprachverständnis. Drei Vorträge. A. PICK. Leipzig, Barth, 1909. Pp. 70.

Ueber Tierpsychologie. Zwei Vorträge. L. EDINGER and E. CLAPARÈDE. The same, 1908. Pp. 67.

Abhandlungen zur Physiologie der Gesichtsempfindungen. (Phys. Inst. z. Freiburg, i. B.) Heft. 3. The same, 1909. Pp. 192.

Beiträge zur Analyse der Gesichtswahrnehmungen. F. SCHUMANN. Psychol. Studien, Heft. 2. The same, 1908. Pp. 223.

Bericht über den III. Kongress für experimentelle Psychologie in Frankfurt a. Main, 1908. F. SCHUMANN. The same, 1908. Pp. xxii + 263. M. 9.

Les Merveilles de l'Hypnotisme. G. BONNET. Paris, Rousset, 1909. Pp. xvi + 281.

Phrenology or the Doctrine of the Mental Phenomena. J. G. SPURZHEIM. Ed., with Introduction, from the second American edition (Boston, 1833) by C. ELDER. Philadephia, Lippincott, 1908. Pp. 459. $3.00 net.

Transactions of the Third International Congress of the History of Religions. Oxford, Clarendon Press, 1908. Vol. I., pp. xl + 327. Vol. II., pp. 457. 21 s. net.

The Origin of the Sense of Beauty. F. CLAY. London, Smith, Elder & Co., 1908. Pp. xviii + 302.
Locke. S. ALEXANDER. London, Constable, 1908. Pp. 90.

NOTES AND NEWS.

AT the recent meeting of the American Psychological Association Professor Charles H. Judd, of Yale University, was elected president for the coming year; Professor A. H. Pierce continues as secretary. The report of the proceedings at the Baltimore meeting will appear in our next issue.

THE American Philosophical Association elected Professor J. G. Hibben, of Princeton University, president; Professor J. H. Tufts, of the University of Chicago, vice-president; Professor F. Thilly, of Cornell University, secretary-treasurer.

AT the recent meeting of the Southern Society for Philosophy and Psychology, held at the Johns Hopkins University, Baltimore, Md., the following officers were elected for 1909: President, Professor Albert Lefevre, University of Virginia; Vice-President, Dr. Shepherd Ivory Franz, Government Hospital for the Insane, Washington, D. C.; Secretary-Treasurer, Professor Edward Franklin Buchner, Johns Hopkins University; to serve three years as members of the Council: Professor James Franklin Messenger, State Normal School, Farmville, Va., Professor Robert Morris Ogden, University of Tennessee.

DR. J. E. W. WALLIN has been called from East Stroudsburg, Pa., to the City Normal Training School, Cleveland, O.

THE following are taken from the press:

DR. RUDOLF EUCKEN, Professor of Philosophy at Jena, has been awarded the Nobel prize in literature.

AT Hobart College, Dr. F. P. Boswell has been appointed assistant professor of psychology and mathematics.

PROFESSOR HUGO MÜNSTERBERG recently delivered lectures at Chicago, Toronto, and Ithaca. Professor C. H. Judd lectured on December 9 before the Sigma Xi Society at Chicago, on 'Visual Perception and Eye Movements.' Professor E. B. Titchener will give a course of lectures in psychology at the University of Illinois, probably during the latter part of March.

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THE

PSYCHOLOGICAL BULLETIN

PROCEEDINGS OF THE SEVENTEENTH ANNUAL MEETING OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION, BALTIMORE, DECEMBER 29, 30 AND 31, 1908.

Report of the Secretary.

The seventeenth annual meeting of the American Psychological Association was held in Baltimore on Tuesday, Wednesday and Thursday, December 29, 30 and 31, 1908, under the auspices of the Johns Hopkins University and in conjunction with the American Philosophical Association, the Southern Society for Philosophy and Psychology, and other societies affiliated with the American Association for the Advancement of Science. About the usual number of members was in attendance. The Southern Society very kindly placed its sessions so that its members could be free to follow the principal portions of our program.

All sessions were held in Levering Hall, at which place everything that could conduce to the comfort and convenience of the attending members was provided by the Department of Philosophy and Psychology of the University.

A number of papers announced on the program were necessarily omitted because of the unavoidable absence of their writers, but there was no lack of material to occupy the time of the various sessions.

On Monday evening, December 28, a reception was tendered to the visiting societies by the president and the board of trustees of Johns Hopkins University.

On Tuesday morning, December 29, at ten o'clock, the meeting was formally opened by the president, Mr. Stratton. After the usual preliminary announcement of the council's nominations for officers, the reading of the papers was begun.

A large part of the afternoon session of Tuesday was devoted to

the report of the Committee on Measurements, which was presented by the chairman, J. R. Angell, and by several of those who have been associated with him in this work.

On Wednesday morning, December 31, a joint session was held with Section L (Education) of the American Association for the Advancement of Science, the six papers of which were interesting contributions to the experimental side of applied psychology.

In the afternoon of Wednesday was held a joint session with the Southern Society for Philosophy and Psychology. Following this joint session came the address of the President on 'The Betterment of Rival Types of Explication.' The Philosophical Association adjourned to listen to this address.

On Wednesday evening President Hugo Münsterberg of the American Philosophical Association delivered his address on 'The Problem of Beauty.' This was followed by a joint smoker with the American Philosophical Association and the Southern Society for Philosophy and Psychology held at the Johns Hopkins Club.

On Thursday morning the annual business meeting was held, after which the remainder of the day was devoted to papers and discussions, the afternoon session adjourning for the address of President J. McBride Sterrett of the Southern Society on 'The Proper Affiliation of Psychology.'

At the close of the last session an excellent type of audiometer was demonstrated to those interested in the matter by Mr. J. M. McCallie, of Trenton, N. J.

Abstracts of the various papers will be found below.

At the annual business meeting, held Thursday forenoon, the following business was transacted.

The following officers, nominated by the council, were elected: *President* for 1909, Professor Charles H. Judd, of Yale University; *Members of the Council to serve three years*, Professor E. C. Sanford, of Clark University, and Professor E. L. Thorndike, of Teachers College, Columbia University; *Member of the Council to serve one year*, Professor E. H. Lindley, of Indiana University.

On nomination by the Council the following candidates were elected to membership: Charles Scott Berry, Ph.D., University of Michigan; W. V. D. Bingham, Ph.D., Teachers College, Columbia University; Frederick E. Bolton, Ph.D., State University of Iowa; Foster B. Boswell, Ph.D., Hobart College; Warner Brown, Ph.D., University of California; W. Trigant Burrow, M.D., Johns Hopkins University; Lawrence W. Cole, A.M., Wellesley College; Herbert B.

Davis, Ph.D., State Normal School, California, Pa.; Clarence E. Ferree, Ph.D., Bryn Mawr College; Henry H. Goddard, Ph.D., New Jersey Training School for Feeble-Minded Girls and Boys; Arthur Holmes, Ph.D., University of Pennsylvania; Anna J. McKeag, Ph.D., Wellesley College; Haywood J. Pearce, Ph.D., Brenau College; James Bissett Pratt, Ph.D., Williams College; Daniel Starch, Ph.D., University of Wisconsin; Karl T. Waugh, Ph.D., University of Chicago.

The treasurer's report, audited by the council, was read and approved.

The proposed amendent to the constitution, acted upon and adopted at the previous annual meeting of the association, was, in accordance with Article VII. of the constitution, again brought before the association for action. The amendment is as follows: Making the present Article III. to be Article III., Section 1; and inserting the following as Section 2:

"In case of the death, disability, or resignation of either of these officers, the council shall appoint a successor to serve until the next annual meeting of the association."

It was again voted to adopt this amendment, and it accordingly becomes a part of the constitution of the association.

It was voted to adopt the council's recommendation that a committee be appointed to gather materials for a discussion before the association, presumably at its next annual meeting, on the topic: 'Methods of Teaching Psychology.'

It was voted that a committee of five be appointed for this purpose by the chair. The president later appointed the following: C. E. Seashore, *chairman;* J. R. Angell, M. W. Calkins, E. C. Sanford, G. M. Whipple.

It was voted that the council be authorized to make an expenditure of $150, or such part thereof as shall be necessary, to defray the expenses of publishing the results of the work of the Committee on Measurements; it being understood that a copy of such publication be sent to each member of the association without charge.

The council reported to the association an invitation from the Department of Philosophy and Psychology of Yale University to hold its next annual meeting at New Haven. It was moved and seconded that this invitation be accepted. After discussion of the matter, in view of the fact that the American Association for the Advancement of Science is to meet in Boston at that time, it was voted that the above motion be referred to the council, with power to act, with the suggestion that

their action be guided by information obtained from the entire membership of the association. (The decision of the council will be announced at a later date in the news items of the PSYCHOLOGICAL BULLETIN and other periodicals.)

Professor Baldwin presented the following resolution which was being acted upon by the American Association for the Advancement of Science and Affiliated Societies: "Resolved that this Association most urgently recommends to the Committee on Ways and Means, or other body having the matter in charge, that the present duty on scientific books published in English be removed." This resolution was unanimously adopted.

On motion of Mr. Seashore that the president and secretary be asked to confer with the council of the American Association for the Advancement of Science in reference to the advisability of forming a separate Section of Psychology, it was voted, after considerable discussion, to refer this motion to the council for report.

Professor Judd was appointed the representative of this association on the council of the American Association for the Advancement of Science.

It was voted that the council be authorized to expend an amount, not to exceed $20, to defray express charges on apparatus to be used for purposes of demonstration at the next annual meeting.

It was voted that an expression of thanks be extended to the Department of Philosophy and Psychology of Johns Hopkins University for its hospitality on the occasion of this meeting.

It was voted that the proceedings of this meeting be printed.

REPORT OF THE TREASURER FOR 1908.

DR.

To Balance from 1907 meeting	$2,837.86
Dues received from members	219.35
Interest from July 1, 1907, to July 1, 1908	106.90
	$3,164.11

CR.

Stationery and printing	$ 57.19	
Clerical assistance	6.95	
Postage	31.15	
Travelling expenses (1906 and 1907)	98.50	
Exchange on checks	.90	
Petty cash	1.39	
Petty cash on hand	10.02	206.10

Balance in Union Dime Savings Institution.....	$2,753.64	
Balance in Fifth Avenue Bank.....	204.37	2,958.01
		$3,164.11

NORTHAMPTON, December 18, 1908.

A. H. PIERCE,
Secretary and Treasurer.

Audited by the council.

ABSTRACTS OF PAPERS.

President's Address: The Betterment of Rival Types of Explication. GEORGE MALCOLM STRATTON.

(This address will be published in full in the PSYCHOLOGICAL REVIEW, Vol. XVI., No. 2, March, 1909.)

Further Experiments with Birds. JAMES P. PORTER.

Part I. — Experiments with a pair of ring-neck doves with the food-box (see page 257, *Amer. Jour. Psych.*, XVII.) show for the female practically the same results as for other birds. When the strings are changed to the opposite side of the door the female does not learn to open the box. The male shows no signs of imitation.

The work on color discrimination has so far followed the methods first used with birds (page 265 of reference cited above). In a cage in the Clark University laboratory, through the courtesy of Mr. Worthington, at the Society for the Investigation of Bird Life, Shawnee-on-Delaware, Pa., and at the Hadwen Arboretum, Worcester, Mass., many experiments with glasses covered with colored papers are in striking agreement by way of showing that both ring-neck and homing pigeons learn to discriminate almost perfectly in from one third to two fifths fewer trials than those required by the English sparrow. Their discrimination is not so good when only tints and shades of the same color are used. When tints replace the standard color they rarely confuse these with the other colors, or light or dark gray.

To discriminate forms many more tests are necessary than for color. With forms set in front of neutral gray glasses the same difficulty is found as with the form-boxes used in earlier work with other birds.

The homing pigeons with minor differences corroborate the findings with the ring-necks. Two young homing pigeons four months old were found to be erratic in their results, largely because they were distracted by the actions of other birds in other nearby cages.

In view of the fact that pigeons are said to be among the most

stupid of birds, the above tests seem to suggest the desirability of some such study as the above and the further prosecution of the same.

(The above is a report of work done by Mr. A. W. Kallom.)

Part II. — In the observation and experiments with two young single yellow head parrots (*Chrysotis ochrocephalous*) during the past ten months the following results have been obtained:

1. Well marked diurnal periods at morning and evening, particularly the latter, when these birds are very noisy, whistling, singing and cackling. This last would by many be called 'laughing.' The descriptions of the behavior of these birds in their native habitat confirm these observations.

2. Their behavior during the mating period points to the fact that we have in these birds probably as highly developed a social life as in any other bird. Guarding, protecting. The male is constantly biting and guarding the female as well as going through all sorts of showing-off performances.

3. Examples of sudden imitation occur in both, and, while some of these may be explained under the head of 'deferred imitation,' it is impossible for the writer to see at present how all cases may be so explained.

4. So long as the male was present the female showed about as little inclination to talk as the female song birds do to sing. This would seem to be due in part at least to the treatment accorded her by the male. With the male absent, the female does imitate but less perfectly and readily than the male.

5. Tests as to relative ability to learn are as yet inconclusive, but experiments with colored glasses indicate more rapid discrimination than that found for even the pigeons.

The Relation of Age, Sex and Condition of Stimulation to Habit Formation in the Dancing Mouse. ROBERT M. YERKES.

A quantitative investigation of the relation of age and sex of the dancing mouse to rapidity of acquisition of a habit involving visual discrimination has revealed the following facts:

1. The rapidity of habit formation depends upon, (*a*) the visual capacity of the individual, and (*b*) the associative memory of the individual. (That there are other internal factors, less important than these perhaps, is not denied.)

2. A given condition of visual discrimination varies in difficultness with the age and sex of the individual.

3. When the visual stimuli to be discriminated differ markedly

(easy discrimination), dancers of eight months of age acquire a habit more rapidly than do individuals of one month of age.

4. When the visual stimuli to be discriminated differ slightly (difficult discrimination), young individuals learn the more rapidly.

5. Averages for twenty males and the same number of females indicate that with a moderately difficult condition of visual discrimination, the females acquire a habit more rapidly than the males. The curves of habit formation for the sexes indicate certain important differences in the learning processes.

6. Rapidity of habit formation depends also upon the strength of the stimulus which is used as an incentive to or condition of learning (in these experiments an induced electric current). The conclusion at present indicated is that as the difficultness of visual discrimination increases the value of the optimal stimulus approaches the threshold.

7. The male dancer is somewhat more sensitive to the electric stimulus than the female. There are no marked differences in sensitiveness to be correlated with age.

8. As the dancer ages (between one month and ten, at least), ability to discriminate by difference in luminosity appears either to diminish slightly or to be acquired less readily.

9. Associative memory, if anything, improves somewhat between the first and the tenth months of life.

10. In general, the investigation suggests the conclusion that the sense of vision of the dancing mouse can be educated to best advantage during the first few weeks of life, whereas associative ability can be trained to advantage somewhat later.

An Experimental Study of Imitation in Monkeys. M. E. HAGGERTY.

The investigation was carried on in the Harvard Psychological Laboratory and the New York Zoölogical Park. The experiments were all of one sort. The problem was to manipulate a mechanical device and get food. Each animal was allowed to try for itself at five different times for fifteen minutes at a time. Those which failed were allowed to see another animal perform the act and get the food, after which they were again permitted to try for themselves. There were seven different problems, and, in all, eleven cebus and macacus monkeys were used. In all there were twenty cases of repetition of the act observed, wholly or partially successful, as contrasted with five complete failures. Of the eleven animals used all but two exhibited imitative behavior.

The Temperature Sense in Squirrels. CLARENCE S. YOAKUM.

The paper reports tests with 'problem boxes,' the maze, and a new piece of apparatus for testing the temperature sense by the discrimination method. The gray squirrel learns in these experiments by the usual trial and error process. In all experiments emotional factors are more prominent in the actions of the squirrel than in those of the white rat. The higher emotional tone seems to be due to the relatively larger importance of the 'distance' receptors in the life of the squirrel. Both the gray squirrel and the white rat can form food associations on the basis of a temperature sense. The squirrel shows a ready ability to discriminate between boxes at temperatures of forty degrees and thirty degrees centigrade respectively.

The Phenomena of Peripheral Vision as Affected by Chromatic and Achromatic Adaptation with Special Reference to the After-image. G. M. FERNALD.

In a recent paper Professor Titchener[1] suggests that certain after-images reported by us[2] are due to chromatic adaptation. The reasons why we seem unable to accept this explanation for our results have already been given.[3] The after-images in question, as well as a whole group of related phenomena, seem directly dependent on certain achromatic conditions.

Investigations completed but not published before Professor Titchener's criticism appeared show that certain colors appear more saturated and are distinguished at a greater degree of eccentricity under certain brightness conditions than under others. The most pronounced effects on the saturation in color tone are produced when the stimulus appears darker or lighter because of contrast with a light or dark background. A similar effect is produced on the saturation and color tone of the after-image by projecting it on a light or dark background, *i. e.*, different brightnesses of projection ground are particularly favorable to the different colors. The effect of observing the after-image on a totally darkened field, as in the dark room, is to completely obliterate it just as the color of the stimulus is lost when the stimulus is sufficiently darkened. Under certain brightness conditions chromatic

[1] E. B. Titchener and W. H. Pyle, 'On the After-Images of Subliminally Colored Stimuli,' *Proc. of the Amer. Philos. Soc.*, Vol. XLVII., No. 189, 1908.

[2] PSYCHOL. REV., Vol. XII., 1905, pp. 386–425; Vol. XV., 1908, pp. 25–43. Also H. B. Thompson and K. Gordon, PSYCHOL. REV., Vol. XIV., 1907, pp. 122–167.

[3] *Journ. of Philos., Psychol. and Sci. Methods*, Vol. III., 1906, p. 352.

after-images follow unperceived color stimuli. These after-images occur when the stimulus color is so darkened by contrast with a white background that its limits are decreased and the after-image is projected on a screen whose brightness is especially favorable to the color of the after-image.

Two important points raised by Professor Titchener, which seem to us to require further investigation, are those concerning the method of determining zonal limits and the significance of irregularities at the periphery. The fact that Professor Baird's results, used by Professor Titchener,[1] as well as our own, show decided irregularities at the outer limits, seems to suggest that such variability is unavoidable.

Report of Committee on Measurements. JAMES R. ANGELL, *Chairman.*

The committee on tests has made substantial progress during the past year and expects to be ready to publish at least a part of its findings during the coming year. To this end it has requested the association to authorize publication under such conditions as may seem to the association advisable.

In view of the expectation of publication in full, a detailed report at this time would appear superfluous. The topics under investigation may be stated, it being understood that the work of the committee covers apparatus, methods of investigation and treatment of results; association tests, motor tests, tests on ideational types, pitch discrimination, intensity of sound determinations; and in animal psychology a determination of the phenomena of color vision.

So far as practicable the committee intends before publishing its findings to have the results of each member tested by at least two other members.

Joint Session with Section L (Education) of the American Association for the Advancement of Science.

Psychological Investigations that Will Help Education. E. A. KIRKPATRICK.

It is agreed that the ends of education, whatever they may be, are best reached by proceeding in accordance with psychological principles. This has been recognized in a general way only in arranging courses of study, methods of teaching and class management. As yet,

[1] The results referred to are those mentioned by Professor Titchener on page 378, *op. cit.* As in our work, Baird's results with red and green are more irregular than those with blue and yellow.

however, the practical application of the results of experimental psychology have been very few. The results of studies of learning processes should soon be practically applied by teachers, but they cannot be used under ordinary school conditions until complex processes have been more fully analyzed so as to determine the mental and physiological processes involved in them and their functioning studied under ordinary school conditions. Memory is as much a process of judging as it is of reproducing former activities and the key to the most fundamental educational principles is to be found by a study of standards used in understanding and remembering. Such a study, carefully made, should yield definite rules of procedure to be followed in the acquisition of knowledge and skill analogous to those furnished by physics to mechanics or to those given by chemists and biologists to agriculturists.

Studies of Number Consciousness. C. H. JUDD.

Experimental methods of treating number consciousness are much more difficult to develop than methods of dealing with other forms of mental activity of interest to the student of educational psychology. One of the simpler processes involved in the formation of number ideas, namely, that of counting, can be dealt with experimentally as follows: First, a number of individuals were directed to count as rapidly as possible and to record by means of a hand reaction the beginning and end of each series. It was found that, for nine out of fifteen persons examined, counting aloud was either more rapid than silent counting, or equally rapid with it. In some cases the effort to inhibit articulation in counting retarded the process of silent counting so that it was twenty or thirty per cent. slower than the process of counting aloud. Certain other series of articulation can be found which are more rapid than counting, thus in some individuals the articulation of the letters of the alphabet is more rapid than the articulation of the names of numerals. In general the articulation of the names of all the numerals beyond ten is so difficult that for experimental purposes only the series from one to ten can be used.

After determining the maximum rate at which the short series of numerals or similar groups of letters can be articulated, experiments were instituted to determine the rate at which sounds, tactual impressions or successive visual impressions can be counted. The process of counting a series of sensory impressions involves the process of relating the internal series investigated in the first part of the experiment to an external succession. In a number of individuals it was

found that this relating of the inner series to the external series is easily possible when the external series consists of a succession of sounds. It is always more difficult when the external series consists of tactual impressions and extremely difficult when the external series consists of visual impressions. Furthermore, there are some individuals who find the counting of auditory impressions difficult. Taking the most favorable cases, namely, the cases of those individuals who exhibit a good ability for counting a succession of sounds, it was found in a number of cases that the ability to count under such conditions reaches its limit at the same point that the ability to count without reference to external stimuli reaches its limit of rapidity. Only one individual out of five was able to group together successive series of sounds in groups of ten more rapidly than he could articulate the numerals. The counting of sounds seems to be limited therefore in several cases by the ability of the individual to formulate some internal rhythmical series which shall correspond to the external succession. For most persons the internal rhythm is the rhythm of articulation. In these same individuals the other forms of sensory experience offer much greater difficulty and the adjustment between internal and external successions is a more complicated process. In some individuals the relating of internal and external series offers under any conditions difficulties which do not appear in the pure inner series.

The Factors of 'General Ability.' E. L. THORNDIKE.

Taking general intellectual ability to mean a properly weighted average of abilities in those functions by which men control their environment and themselves, we find that the associative and selective processes correlate with it somewhat closely, much more closely than do the more purely sensory and motor abilities. Spearman's claim that the common factor in sensory discriminations is identical with the common factor of all intellectual functions is not upheld by later studies.

The hypothesis is suggested that the physiological basis for differences in general intellectual ability is differences in the number of endings of the axones and their collaterals, and in the variety, extent and excitability of their changes of positions. The attempt is made to show that these quantitative differences in the structure and action-systems of the neurones are adequate to parallel the qualitative differences in general intellect.

Homogeneous Content in the Measurement of Continuous Memory Processes. CARL E. SEASHORE.

The experimenter in education should look to psychology for tested methods and apparatus. The development of technique in psychology may be an object in itself.

The method proposed secures the following conditions for the content in a memory process: (*a*) Homogeneity, (*b*) possibility of continuing the process for any length of time with the same content, (*c*) favorable conditions for fractionating the introspections, and for exact account of imagery and associations, (*d*) detailed record of each element in the process, (*e*) adaptation to, and variation for, different memory types, (*f*) variation in the impression, the retention, the reproduction, and the association, under control, (*g*) may be adapted for use in the study of memory as it enters into fatigue, adaptation, practice, transference of training, comparison of types, comparison of conditions, attention, etc. The plan is to use only three or four sensory stimuli, and these shall differ in one respect only.

The General Effects of Special Practice in Memory. W. F. DEARBORN.

This paper is concerned chiefly with a critique of recent experimental work with a special reference to the results of Ebert and Meumann. The possibility of improvement through the repetition of the test series themselves may in part account for the unusually large amount of the apparent influence of the special practice. The test series of Ebert and Meumann have been repeated under similar conditions, intervals of time, etc. The results indicate that a considerable part of the improvement found must be attributed to direct practice in the test series, and not to any 'spread' of improvement from the practice series proper. There is further, at times, lack of correlation between the amount of improvement made in the practice and that made in the test series; occasionally a larger percentage of gain is made in the latter than in the practice itself. This again indicates the presence of direct practice in the test series.

Some at least of the remaining general improvement found is to be explained simply in terms of orientation, attention, and changes in the technique of learning.

These results seem to render unnecessary the hypothesis proposed by Ebert and Meumann to account for the large extent of the general influence of special practice, which their experiments seem to indicate.

The Study and Treatment of Retardation. LIGHTNER WITMER.

(This paper will be published in full in an early issue of the PSYCHOLOGICAL REVIEW.)

Joint Session with the Southern Society for Philosophy and Psychology.

Sensations following Nerve Division. SHEPHERD IVORY FRANZ.

Examinations of an individual in whose arm the ulnar and median (probably also the medial antibrachial cutaneous) nerves were cut show that the losses of sensation are similar to those found by Head and Sherren, and that the sensations may be classed as these authors have done into: epicritic, protopathic and deep. Certain differences were found with the help of a Bloch instrument in the touch sensations. These are that although parts of the skin are apparently normal — *i. e.*, retain the epicritic sensibility — these parts show differences in threshold values, the greatest value being close to the line of epicritic loss and there being a gradual decrease in the threshold outward. These results indicate, contrary to the supposition of Head, that there is an overlapping of the nerve supply.

Examinations of the hair and temperature sensibilities gave deviations from the results of Head. In certain places the hairs were found to be sensitive to light touches, but not to plucking. This result may be taken to indicate a physiological explanation of the histological findings of Tello, of two kinds of sensory nerve endings in or near the hair bulbs. Cool, cold, warm, and hot stimuli were sensed in such a way that the general results of Head were confirmed, but it is apparent that there is an overlapping of the temperature nerve supply. The results on hair and temperature sensibility can best be explained by assuming a double nerve supply for both.

Suggestions from Two Cases of Cerebral Surgery without Anæsthetics. GEORGE TRUMBULL LADD.

The paper deals with two cases of cerebral surgery which have recently been performed without the use of anæsthetics. A brief narrative is first given of the one case, of which a printed record is available; certain facts are then given, as learned by correspondence, concerning the other case, whose record has not yet been given to the public. Suggestions follow as to the sensitivity of the brain substance and the dura; as to the nature of cerebral localization; as to the educability of the brain; and, finally, as to a possible independence of the life of self-consciousness, of the integrity of the nervous centers.

Some Aspects of Attention Involved in the Observation of Near Simultaneous Retinal Stimuli. DAVID SPENCE HILL.

In this experiment, by means of a wheel tachistoscope, two illuminated discs were exposed to the periphery of both eyes, the right leading, the left leading, or simultaneously. The device permitted divisions of time intervals as fine as .00092 of a second, the equivalent of a millimeter of movement. In four series of experiments with six observers, it was found: (1) That both trained and untrained introspectionists could be led by suggestion to judge intervals erroneously which had been judged correctly a few minutes before. (2) That in tests with and without an interfering signal an individual preference of attention existed, *i. e.*, where the perceptions were doubtful the observer tends uniformly to decide in favor of right or left stimulus in accordance with this preference or predisposition. The influence of motor sensations, of erroneous placing of stimuli unequally upon the retina of local or cerebral abnormalities, are all possible factors correlated with these seeming preferences of attention. It has been suggested that they may have some relation to our reading habits; upon this hypothesis it would be interesting to subject groups of Jews, Chinese, young children, mature English readers and illiterates to comparative tests by means of a simple tachistoscope. (3) That the nature of attention in such experiments, though perhaps predominantly characteristic of the individual, may vary during a single sitting, with objectively uniform conditions. Two ways of attending or phases of attention were noted in our observers: (*a*) The sensorial, mechanical type, where there is confidence and accuracy, but apparently little conscious conflict of ideational factors, and the record here is, perhaps, nearly that of a perception. (*b*) The apperceptive or associative type, where the record is usually that of a judgment, *i. e.*, the product of a train of ideational factors, a psychic product of greater complexity than the perception. In this the psychic rather than the retinal or objective elements seem to predominate. In this second group also belong those whose records are influenced more by expectation, suggestibility, than by the retinal or external factors.

The above study is presented only as preliminary to a repetition of the quantitative determination of the least observable interval and presents more problems than conclusions, which await further investigations. To this end the writer has mapped out a program and has constructed a second apparatus, which is perhaps an improvement upon the first.

Notes on the Discernment of Likeness and of Unlikeness. G. V. N. DEARBORN.

In judging the likeness and the unlikeness of flat fantastic figures (ink-blots) in black and white the most conspicuous criterion employed is massiveness. The large majority of the subjects make their judgments on the basis of some concept derived by imaginative association rather than on the actual objects presented for comparison. A minority, on the other hand, attend to the real characteristics of the blots, *feel* the likeness and unlikeness. The latter method yields the more accurate judgments. It is suggested in the research-results how strong is the tendency to symbolism in the human mind. The motivity basis of consciousness (its dependence on neuro-muscular innervations) receives strong illustration in the result that of those who required some conceptual basis for comparison nearly all avowed that the concept became clear in their minds only when the word representing it had been formed by their organisms.

A Contribution to the Theory of Tonal Consonance. R. M. OGDEN.

Tonal consonance is a unique experience, somewhat comparable to the experience of recognition. It may be conceived as the conscious symptom of a relatively simple and economic activity on the part of the auditory nerves. This ease of functioning is primarily due to a characteristic organic disposition which has resulted principally from racial experience of overtones.

Overtones are very frequent, if not the invariable, attendants on all tones. We may, therefore, assume that, in accordance with the mathematically simple relationships which exist between overtones and their fundamental, certain definite functional patterns are stimulated. These functional patterns, because of the great frequency of their stimulation, are naturally acquired by the organism as dispositional tendencies. In the history of the race these tendencies gradually manifest themselves by conditioning tonal consonance among those relationships of tones which are conspicuous features of a normal series of overtones. Thus developed, this dispositional tendency operates, not merely to determine the degree of consonance of simultaneously perceived tones, but also to demand consonant supplementation among successively perceived tones.

Tonal consonance is a unique sort of experience, but its uniqueness is referable neither to feeling nor to æsthetic quality. On the contrary, consonance may be experienced as (1) pleasant, unpleasant or affectionally neutral; (2) æsthetic or unæsthetic; (3) any combination of

(1) with (2). In order to acquire affective character, the experience must be either enriched or depleted through some contributory factor. In order to acquire æsthetic character, the experience must occupy the focus of attention, and find itself dominant amidst a total conscious state in which no motives for re-adjustment are conspicuous.

On the Psychological Origin of Religion. JAMES H. LEUBA.

In the first part — the origin of the ideas of ghosts, nature-beings and creators — the ideas of unseen personal beings are traced to four independent sources. (1) States of temporary loss of consciousness, trances, swoons, sleep. (2) Apparitions in sleep, in the hallucinations of fever, of insanity, or otherwise.

Sources one and two constitute the double origin of the belief in *ghosts* or *doubles*. (3) The personification of striking natural phenomena, tornadoes, thunder, sudden spring-vegetation, gives rise to the belief in nature-beings. (4) The necessity of a creator is borne in upon the savage at a very early time, not upon every member of a tribe but upon some peculiarly gifted individuals.

The question to be settled by the student of the origin of religion is concerning the lineage of the first gods. Are they descended from ghosts, or are they nature-beings, or creators ? The idea of a creator is the one more likely to lead to the establishment of relations definite and influential enough to deserve the name religion. But the descendance of gods need not have been the same in every instance.

In the second part — the original emotion of primitive religious life — a discussion of contending theories leads to the suggestion that the phrases *negative religion* should be used to designate man's dealings with radically bad spirits and *positive religion* his relations with fundamentally benevolent ones.

Clearness, Intensity, and Attention. HENRY RUTGERS MARSHALL.

The distinction between intensity and clearness (vividness) is one between intensities of different types. Diversities of intensity are most often noted in the sensational realm: when therefore we consider intensity as such, we usually think of sensational intensity. When intensity is non-sensational, and is distinguished from sensational intensity, we naturally apply the word intensity to sensational intensity, and invent a new term, viz., clearness (or vividness), to designate non-sensational intensity. The difference between intensity and clearness is a difference of ' setting.' Attention-experience always involves an emphasis of an intensity, although attention cannot be identified with such emphasis alone.

An Interpretation of the Psycho-analytic Method in Psychotherapy. W. D. Scott.

According to certain neurologists and psychiatrists hysteria, psychasthenia, obsession and phobia are all caused by suppressed emotional ideas — mainly sexual. These ideas are pressed down into the realm of the subconscious and remain there coexistent with the normal consciousness. They manifest themselves in dreams, hallucinations, automatisms, etc. The cure of the patient is dependent upon raising these ideas up into full consciousness and thus allowing them to live themselves out. The psychoanalytic method is employed to secure this result. The method may be employed in connection with hypnosis, relaxation or free association of ideas. The successful application of the method based upon such a theory is assumed to give great weight to the theory of subconscious ideas in the extreme mythological form.

Even though the method is very successful it does not necessarily follow that the explanation of the result is correct. From my own clinical notes I shall try to show that the method makes the most skillful use of suggestion and that it does not offer any special support to a belief in a realm of subconscious ideas.

The Field of Applied Psychology. Hugo Münsterberg.

The Harvard Psychological Laboratory has started the development of a department for applied psychology with a special assistant for the field. It is to be relatively independent, like the older department of animal psychology. The aim is to build up an experimental science which is related to the traditional laboratory psychology as engineering is related to theoretical physics. So far such studies have been carried out essentially by physicians and by educators. But as soon as a special workshop for applied psychology exists, these psychomedical and psychopedagogical researches will make up only a fraction of the work. Equal importance belongs to the psycholegal researches, dealing with the psychology of the witnesses, of the defendants and so on; to the psychoæsthetic studies, dealing with advice in psychoæsthetic problems from the work of the artist down to that of the cook and dressmaker; to the psychoscientific studies, dealing with the mental factors in scholarly work in observation, experiments and so on; to the psychotechnical studies, dealing with the psychological conditions in our technical civilization in business and commerce and industry, analyzing the conditions of the various occupations with reference to the work of the laborer, to his safety and his

effectiveness and so on; to the psychodiagnostical studies, dealing with the individual differences of man and the means to recognize and to determine his fitness for special lines of work, for special professions and practical vocations; to the psychosocial studies, applying experimental psychology in the interest of social reform and politics and public movements, prevention of crime and social regulation; to the psychoreligious studies, making psychology helpful to the problems of the church and so on. As soon as the movement is more fully recognized in the scientific independence of its problems, which are much more than mere byproducts of theoretical psychology, it will surely bring about the creation of laboratories for applied psychology in every seat of learning; and they may soon show the same ramifications which the technological institutes show to-day.

The Observer as Reporter — A Survey of the Psychologie der Aussage. GUY MONTROSE WHIPPLE.

This paper outlines the conditions that have led to the study of the psychology of testimony, enumerates the problems that have arisen, discusses the methods that have been developed, seeks to summarize and appraise the chief results and to stimulate the interest of American investigators in this field.

The *Aussage* or report is an account of an earlier mental experience. The primary problem of the Aussage-psychologie is the determination of the factors which condition the fulness and accuracy of this account. Its practical application consists in the establishment of rules for the evaluation of reports (testimony) made under given conditions, and the promulgation of methods of training in fidelity of observation and report.

Methods. — The chief methods of investigation are the historical and the experimental. Important problems of procedure in the latter method are the choice of (1) the test-material, (2) the exposure-time, (3) the time-interval between experience and report, (4) the form of report (whether narrative or deposition), (5) the type of interrogatory to be used in the deposition, (6) the quantitative treatment of data and the determination of the several coefficients of report, with particular reference to the problem of grading.

Results. — The chief results in this field to date are: (1) errorless reports are the exception; (2) the average accuracy of report is approximately 75 per cent.; (3) there is no general relation of range to accuracy; (4) there is no general relation between range of report and other constants which depend upon degree of assurance; (5)

attested or sworn statements are not free from error; (6) men appear to surpass women in accuracy, though not in range of report; (7) the reports of defectives are entirely unreliable; (8) the reports of children are in every way inferior to those of adults, and are characterized by exaggerated and unwarranted assurance and a high degree of suggestibility; (9) the relation of report to general intelligence is not satisfactorily determined; (10) a lengthened time-interval is in the main unfavorable, but there are interesting exceptions that indicate the presence of complex influences; (11) not all features are reported with equal fulness or accuracy (colors and numbers being particularly poor); (12) the general principles that govern estimation of duration and magnitude have been approximately determined; (13) the report is conditioned by the ideational type of the observer; (14) the deposition exhibits greater range and less accuracy than the narrative; (15) the use of leading or suggestive questions reduces accuracy markedly, particularly in children; (16) repetition exercises a complex influence; (17) practise, even without specific training, produces improvement; (18) the capacity to report is educable by at least three different methods.

Conclusion. — The *Psychologie der Aussage* has opened a field of interest and importance, to which American investigators have as yet paid almost no attention.

(This paper will appear in full in an early issue of the PSYCHOLOGICAL REVIEW.)

The Abandonment of Sensationalism in Psychology. M. W. CALKINS.

Present-day psychology diverges in several ways from sensationalism. (1) In 1893 Wundt still taught that sensations are the only elements of consciousness. To-day almost all psychologists agree in recognizing also the affective elements, pleasantness and unpleasantness. Wundt, indeed, now adds to these four others: 'tension-relaxation' and 'excitement-depression.' And though he fails in the attempt to show that these are affective elements, that is, that they are of the same class as *Lust* and *Unlust*, he does succeed in supplementing the traditional list of elements of consciousness. 'Tension' turns out to be virtually identical with attention, or 'clearness'; and Titchener has not established his contention that 'clearness' is purely sensational. The other three 'dimensions of affection' are neither elemental nor affective; they are analyzable into (*a*) organic sensations and (*b*) relational elements, that is, elements neither sensational nor effective.

(2) There is no sufficient argument to refute the introspective tes-

timony of writers so diverse as Spencer, James, Stout, the Austrian school of Meinong, Külpe, Bühler, and other members of the Würzburg Institut, Cornelius, Ebbinghaus, Stumpf, Münsterberg, Woodworth, and other American psychologists, who agree that consciousness — and in particular thought — includes these elements, or attributes, which are neither sensational nor affective. The experimental studies of this relational consciousness are especially worthy of attention. The teaching about relational elements of consciousness is, however, open to two criticisms: In the first place the upholders of the doctrine have lacked a certain *esprit de corps;* and, second, they have been prone to claim more than is necessary. For even if there were no imageless thought, it would yet remain true that thought is not all imagery.

(This paper will be published in full in an early issue of the PSYCHOLOGICAL REVIEW.)

A Course of Study in Experimental Pedagogy. GEO. CUTLER FRACKER.

The speaker outlined a course in Experimental Pedagogy which had been successfully offered during a semester of last year. There were experiments on Sense Training, Sense Defects, Nerve Conditions, Motor Defects, Influence of Training, Association, Memory, Memory Training, Fatigue and its Effects, Attention, Rhythm and Imagery. The course seemed a profitable one to a class of ten students who expected to engage in teaching. Expressions regarding the value of the course had been secured from those who are now teaching, which testified to the practical value of the course from the standpoint of the teacher.

The general nature of the course partook of experiments in Psychology, in work in medical inspection, in child-study work, and in experiments which were strictly pedagogical. In offering the course for the coming year the author expects to eliminate much of the purely psychological and enlarge upon the more strictly pedagogical phases.

The Place of Analysis in the Curve of Efficiency (*Preliminary Report*). H. A. RUGER.

Practice curves were taken with thirty mechanical puzzles. Profiting by experience in the case of successful variations dependent on the analysis of those variations and the use of the results of this analysis as an hypothesis to control manipulation rather than on repetition of chance successes with emotional reaction but without analysis. Im-

portance of analysis and hypothesis for transfer within the puzzle series and between it and other forms of experience. Formation of larger units of manipulation dependent on similar analysis and hypothesis covering whole range of movements rather than on process of gradual summation. Possibility of favoring variations.

Illusions in Muscle Localization through Visual Suggestion. D. C. ROGERS.

Through the use of prismatic lenses the hands and other parts of the body are seen in other directions than their true ones. Within wide limits they are felt where they are seen. The illusion is so strong that finger-tips many inches apart may be supposed by the subject to be close together or *vice versa*. Through similar means the hands and feet are felt in unnatural shapes, and vivid feelings of movement are experienced in the hands while they are actually at rest. By testing the localization of an unseen hand or of a sound while one hand is watched through the prisms, or by making such tests after one arm has been trained to movements adjusted to prismatic directions, the organized inter-relations of space perceptions can be studied.

On the Difference between the Method of Expression and the Method of Impression. F. M. URBAN.

The Attitude as a Psychological Concept. IRVING KING.

Psychology has been concerned largely with the analysis and description of so-called mental elements. These are recognizedly *fictions* of science. This paper urges that there is an absolute necessity of supplementing the analytic method by a synthetic treatment of consciousness. The fictions of analytic psychology, taken out of their natural contexts and treated as if isolable quantities, give rise to all sorts of difficulties and contradictions, *e. g.*, those between feeling and emotion on the one hand, and attention and intellectual processes on the other. As a matter of fact, in actual life, the so-called 'elements' are always fused in more or less complex systems, organizations with reference to the various situations of life. These systems may be called 'attitudes.' They are coördinations of processes, biological and psychical, which stand for some phase of the interaction of organism with environment. We use the term 'attitude' as more inclusive than mental content, regarding the latter as an abstraction, having no adequate meaning except within the system of relations holding within the 'attitude.'

The work of the analytic psychologist is not disparaged but is

urged to be incomplete if not supplemented by more recognition of the synthesized aspects of consciousness. It is possible to work out a psychology of 'attitudes' which will be most serviceable in certain directions, *e. g.*, in the sphere of education. The teacher is not concerned with *mere* percepts, ideas, feelings, with the bare laws of association, or even with imparting any information as such, but with the conditions under which these complex, dynamic systems are built up and the method of their interaction. It is impossible in a brief abstract to indicate all the important bearings of a more definite recognition of these systems which may be called attitudes or functional organizations within the self.

PROCEEDINGS OF THE FOURTH ANNUAL MEETING OF THE SOUTHERN SOCIETY FOR PHILOSOPHY AND PSYCHOLOGY, BALTIMORE, MD., DECEMBER 30 AND 31, 1908.

Report of the Secretary.

The fourth annual meeting of the Southern Society for Philosophy and Psychology was held at the Johns Hopkins University, Baltimore, Md., on Wednesday and Thursday, December 30 and 31, 1908, in affiliation with the American Association for the Advancement of Science, the American Psychological Association and the American Philosophical Association. The program as announced was carried out with one minor exception. One third of the members were in attendance, making this the best attended meeting in the history of the society.

Two sessions were held. On Wednesday afternoon, December 30, the society met in joint session with the American Psychological Association in Levering Hall, one half of the six papers presented being read by representatives of the society. The abstracts of these papers appear in the report of the secretary of the American Psychological Association. This session concluded with the address of the president of the American Psychological Association, Professor George M. Stratton, on 'The Betterment of Rival Types of Explication.'

On Wednesday evening, December 30, the society met with the American Philosophical Association in the Assembly Hall of the Baltimore City College for the address of its president, Professor Hugo Münsterberg, on 'The Problem of Beauty.' This was followed by a joint smoker with the American Philosophical Association and the American Psychological Association at the Johns Hopkins club.

The second session was held on Thursday afternoon, December 31, in Room 12, McCoy Hall, at which the papers mentioned below were read. The address of the president on 'The Proper Affiliation of Psychology' (an abstract for discussion), was delivered at 4:30 o'clock, the American Philosophical and Psychological Associations adjourning to meet with the society for this occasion.

At the business meeting which followed the address of the president, the officers for 1909 were elected as follows: *President*, Pro-

fessor Albert Lefevre, of the University of Virginia; *Vice-President*, Professor Shepherd Ivory Franz, of the George Washington University; *Secretary-Treasurer*, Professor Edward Franklin Buchner, of the Johns Hopkins University. Elections to vacancies on the *Council* constituted the elective membership of that body as follows: to serve one year, Dr. William T. Harris, Washington, D.C., and President D. B. Purinton, West Virginia University; to serve two years, Professor J. Mark Baldwin, Johns Hopkins University, and Mr. Reuben Post Halleck, Boys' High School, Louisville, Ky.; to serve three years, Professor J. Franklin Messenger, Virginia State Normal School, and Professor Robert Morris Ogden, University of Tennessee.

Upon receiving a report from the business management of the PSYCHOLOGICAL REVIEW that the annual subscription to the journal would be increased to $4.50 owing to the proposed enlargement of the PSYCHOLOGICAL BULLETIN, it was voted that the annual dues of the subscribing members of the society be increased to $3.50. This increase in dues enables the society to continue the excellent business arrangement with this journal which was entered into at the first annual meeting in 1904. By resolution the society expressed its thanks to the Johns Hopkins University and its Department of Philosophy and Psychology for the excellent provisions made for the comfort of its members during the meeting.

The report of the Treasurer, presented to and approved by the Council, showed a balance on hand of $63.73.

On nomination by the council, the following were elected to membership in the society: Professor J. C. Barnes, Marysville College; Professor Frank T. Day, Randolph-Macon College; Professor Charles A. Dubray, Marist College; Professor Fletcher B. Dresslar, University of Alabama; Dr. Knight Dunlap, Johns Hopkins University; Professor Philip Johnson, Bethany College; Professor C. N. McAllister, Missouri State Normal School; Professor G. B. Moore, University of South Carolina; Professor Josiah Morse, Peabody Normal College; Professor Bruce R. Payne, University of Virginia; Professor George M. Sauvage, Catholic University of America; Dr. Karl Schmidt, University of Florida; Professor Edmund T. Shanahan, Catholic University of America; Dr. William T. Shepherd, George Washington University; Professor John Broadus Watson, Johns Hopkins University; Dr. Clarence S. Yoakum, University of Texas.

Abstracts of Papers.

A Point of View in Comparative Psychology. John Broadus Watson.

This paper raises the general question of what the mental attitude of the animal psychologist ought to be when he observes the behavior of his animal subjects. The investigator in this field of psychology scientifically examines and records the adjustments which it is possible for his animal to make. When all of his data are at hand, is it necessary for him to set up a criterion of consciousness and attempt to apply it specifically in order to give scientific justification and value to the facts just observed in the experimental room? This question was raised in connection with a discussion of the various criteria of the psychic proposed by Loeb, Morgan, Lukas and Yerkes. The opinion was expressed that these criteria are impossible of application and that they have been valueless to the science, both from the standpoint of theory as well as from that of obtaining facts.

The position was taken that 'facts of behavior' are not grounded in criteria of the psychic and that they are not embarrassed by the total absence of any criterion of the psychic in the mind of the investigator who obtains them. The record of the rise of a red-green discrimination habit in a monkey, obtained under suitable conditions of control, is as objective a fact as is the record of a color-blind test made upon a human being under similar conditions of control, or as the statement of the test for the presence of radium in some inorganic compound. All three 'facts' are obtained under conditions which are scientifically exact, which can easily be repeated and verified by some other observer. The facts obtained from tests on the red-green vision of the monkey are immediately taken up and woven into the increasingly complex fabric which we indifferently call animal psychology or animal behavior. The facts obtained from similar tests upon the color-blind human being become a part of the structure we call human experimental psychology; while the facts obtained from the test for radium are likewise taken up into that vast body of knowledge we call chemistry.

Facts of behavior are admittedly not obtained by introspection, but are obtained by observing reactions under conditions of control. But this admission does not rob them of their place in science as a whole nor even of their place in the specific science of psychology. Much of the data obtained in the human experimental laboratory are not obtained by the use of introspection, as for example, our large and

valuable data on eye movement, the formation of habits involving muscular skill, etc. Such data, however, have become an integral part of experimental psychology. It would appear that even human experimental psychology is putting more and more emphasis upon methods of observing and of recording reactions rather than upon the methods involving primarily introspection and the use of the speech reaction, as means for obtaining its scientific facts. As our scientific technique in controlling the conditions under which a given reaction may be made and recorded comes more nearly to resemble the perfection of technique of the physical sciences, there will be less and less inclination to base any investigation upon a record obtained solely from the use of introspection (questionnaires, etc.).

In the light of these tendencies, we may safely say that the same point of view which the human psychologist is coming more and more to carry with him in observing his human subjects will serve him equally well in making tests upon defective individuals, children and animals. The question of a criterion of the psychic will distress him no more when he tests color vision in monkeys than when he tests the color vision of his partially color-blind laboratory boy. Criteria of the psychic will disappear from the field as soon as we are willing to include in the study of psychology the whole of the 'process of adjustment' and to consider that process ontogenetically and phylogenetically in all of its broad biological aspects rather than to confine our attention merely to that phase of it which pertains to the presence or absence of certain mental elements which we can introspectively verify when the adjustment happens to concern our own organism.

The Extensity Theory of Pitch. KNIGHT DUNLAP.

The Nodal-Figure hypotheses and the 'Telephone' hypotheses of tone perception are excluded by the known anatomical and pathological facts, and the psycho-physical analogies. The Selective Vibration (Local-Sign) hypotheses are not yet excluded, although anatomical investigations have discredited the Helmholtz-Hensen explanation. The Extensity hypothesis is given additional probability by the discovery of the structure and probable function of the tectorial membrane. Phenomena which are more satisfactorily explained by the Extensity theory than by a Local-Sign theory are: (1) Obliteration of high notes by low notes, the reverse not occurring. (2) Either inaccuracy or accuracy of interval estimation, with or without absolute pitch; and temporary absolute pitch. (3) Influence of practise on the perception of partial tones. (4) Pathological cases in which

a number of distinct (non-fusing) 'subjective' tones occur simultaneously, several being apparently of the same pitch, at the upper threshold. (5) The greater loudness of high tones of same energy as lower tones. (6) Pitch contrast: the easily demonstrated influence of a note on the estimation of the pitch of a succeeding note of different pitch.

The Trend of the Clinician's Concept of Hysteria. TOM A. WILLIAMS.

Cases of hysteria in the Salpêtrière of to-day prove the artificiality of the four phases of hysterical attack described by Charcot. Moreover, such stigmata as anæsthesia, contraction of visual field, muscular contracture, Lesègue's syndrome, and catalepsy as well as amnesia are no longer found when Babinski's technique is employed in examining hysterical patients. Suggestibility is the only sign of hysteria; and indeed a hysterical symptom is merely one 'producible by suggestion and removable by suggestion-persuasion.'

What, then, of the œdemas, sweating, fever, ulcers, hæmorrhages, occurring in hystericals? They emanate from other causes, less clearly ascertainable in the early days of medical science, but now better known. Most of those not due to disease are often discovered to be produced by a patient of mythomanic tendency such as that of the girl who pretended to die and afterwards confessed she was never so much amused as when watching the tears of her friends and their efforts to rouse her. Malingering is a form of mythomania often suggested by types of disease seen in hospitals. In so far as suggested it is hysteria: but not otherwise. The traumatic neurosis is a form of hysteria being induced by environmental expectation and sympathy and fostered by ignorance, venality, having sometimes, however, a strong tinge of self-pitying mythomanic poltroonery. Illustrative cases teem in medico-legal literature.

The more detective skill and rigorous method is used, more and more of such cases disappear from the class hysteria.

Likewise, the modification of the reflexes, tendon, cutaneous, vaso-motor and dilator, are not suggestible phenomena but are always due to perturbation of the nervous system otherwise engendered, as by emotion and organic disease.

However, suggestibility is favored by certain organic states, the toxi-infectious ones particularly, and these may be accompanied by other phenomena, as in uræmia, where a temporary organic palsy may be due to œdema and may accompany a hysterical state.

However, emotionalism is not hysteria, except when it is suggested, although many patients when under the influence of strong emotion may lose control and thus be more suggestible. The contrary, however, is as often true, and a powerful emotion will produce an insusceptibility to external expressions.

Although neurasthenia and psychasthenia are not produced or influenced by suggestion, yet the subjective symptoms of the neurasthenic state may be acquired by suggestion, as the author has shown elsewhere. The suggestions of organic disease are very powerful and may lead to a complete disability not justifiable by the organic state, as in tabes. But the suggestions of the medical attendant are the most powerful of all and many a hysteria is thus perpetuated.

The hallucinations of hystericals are not veridical but idiogenetic, as Sidis has shown. Although physiological data are lacking for the explanation of hysteria, it appears clear that the state is favored by biochemical modifications which delay or inhibit the more complex neural processes of association, and psychologically speaking there then occurs an arrest of mental synthesis which explains the individual's increased suggestibility.

But hysteria is neither lack of mental synthesis nor cerebral intoxication; for either of these conditions occurs without increased suggestibility. Thus for a definition of a hysterical symptom we cannot but accept that of Babinski: 'The property of being producible by suggestion and removable by suggestion-persuasion.'

The Will and Belief. Edward E. Richardson.

This paper is a consideration of the occasion and essential nature of those higher syntheses of experience which are made in response to a desire to constructively order the totality of experience or the impulse to obtain a rational world. It is from this invincible impulse to somehow rationalize his world of experience that man has been led to philosophy and science. Reference is made to the well-known views of Professor James and others concerning this rationalizing of the world of experience. Attention is next directed towards the occasion of the limitations of a purely intellectual endeavor to accomplish this result and to the conscious desire that the boundaries of experience shall in some way be brought within a synthesis or given a rational meaning. This is with particular reference to Professor James's contention that volitional activity is of paramount importance here, or is a necessary means to accomplish the desired result. After a mention of the uses that are made of speculative scientific hypotheses, religious

beliefs, etc., the question is raised as to whether these are to be regarded as having their ground in the volitional, emotional or rational side of our three-fold mental activity. Following the consideration of the occasion and ground of this impulse, attention is next directed to the character or nature of this impulse or want as regards the rationality of our experience and the relation which this has to faith and belief, as well as the significance of these two as regards their mutual relation. The psychological bearing of will and belief are also briefly touched upon.

The main conclusion that is reached by the paper is that the ground of the means made use of to accomplish the desired end, to satisfy the want, lies in the rational nature — attention being called to the distinction between the theoretical and rational. The further deduction is drawn that if the occasion and ground of this impulse or desire is to be found in the rational phase of mental activity, and if the various means or steps that are taken, satisfy that which calls them forth, then these same means must partake somewhat of the nature of that which makes use of them. In other words, they must be rationalistic in their inmost character when all considerations are properly weighed. The construction or unification of experience follows certain definite lines which are not left to the free choice of particular experiencing individuals. The experiential world as finally synthetized is the same for all who experience and is not irrational in its ground or nature.

Sketch of a Proposed History of Æsthetics. WILLIAM DAVIS FURRY.

Sully long ago pointed out that the most important fact about æsthetics is its unfruitfulness, a conclusion which Groos also reaches and attributes it to the holding of a wrong method in æsthetic investigation as well as also the limiting of the investigation to an insufficient material. For a long time the æsthetic object was regarded as one with the perceptual object. Æsthetic investigation then confined itself to an analysis of the object thus given. Later investigation finds it necessary to distinguish between the æsthetic and the perceptual object. The two can no longer be identified. The problem is generally stated as that of 'form' and 'content.' This content is thought of in two ways: by Bosanquet the content of the æsthetic object is thought of under an abstract intellectual form as the objective Idea revealing itself to reason through sensuous appearance. Beauty is thus the Absolute realizing itself in the relative. Æsthetic theory is therefore to be regarded as a branch of philosophy and 'exists for the sake of knowledge and not

as a guide to practice.' Thus the æsthetic is reduced to the theoretical, and the history of the æsthetic is not the history of the rise and development of the æsthetic as a *sui generis* type of experience but is pursued wholly in the interests of the unfolding of the Idea as a metaphysical postulate.

The investigations of Lipps and others have given the *coup de grâce* to the abstract formalism of the extreme Idealists by showing that the formal elements of beauty such as lines, tones and colors have vital as well as formal meaning for the imagination. Art is nature made human (Raymond). The landscape painting of to-day reveals to us how the more subtle modes of nature participate in human experience while even the more inert forms of architecture are enjoyed as sharing in our experience. According to Lipps, who has done most in resolving beauty into content for the imagination, the essential process in æsthetic enjoyment is 'Einfühlung.' It is a new creation, an illusion, what the Germans call a 'Schein,' indulged and enjoyed for its own sake.

The limitation of the theory of 'Einfühlung' as held by Lipps is that it too lacks the genetic motive and method. He makes art the embodiment of the self without indicating the successive stages through which the self passes. Moreover, Lipps identifies the self with the sense of practical worth, thus reducing the æsthetic to the practical.

The proposed work, of which this is a notice, represents an attempt to show that the two great methods of studying the æsthetic experience, both methods being genetic, yield certain parallel results. The two methods are the 'Psycho-genetic,' the study of the rise and development of the æsthetic in the individual, and the 'Anthropo-genetic,' the study of the rise and development of the æsthetic experience in the race.[1] Both in the race and the individual, the æsthetic is to be regarded as developing from a primitive, undifferentiated experience in which the æsthetic is not distinguished from the great body of affective conative dispositions, to an experience in which the æsthetic is regarded and utilized as a distinct type of experience.

In the proposed work the æsthetic is regarded as a type of experience *sui generis*. From the outset consciousness reveals the presence and operation of a type of interest that cannot be identified with any other. The history of æsthetics becomes the problem of tracing the rise and development of this interest. Volkelt has indicated four

[1] Following Baldwin (*Trans. Third Int. Cong. Hist. of Religions*, Oxford, 1908, I., 389) who uses the term 'Bio-genetic' also for racial history biologically considered.

norms of the æsthetic experience: (1) the most primitive, in which there is a more or less perfect union of form and content; (2) the 'humanly significant'; (3) the 'lowering of reality,' that is, an experience in which form and content have fallen apart; (4) the æsthetic object as an organic unity. The writer prefers the term mode to that of norm and distinguishes three modes in the development of the æsthetic experience alike in the individual and the race. In the case of the individual these three modes have in current discussion been reconstructed with much fullness. Recent work in anthropology, archæology and what the Germans calls 'Völkerpsychologie' makes possible such reconstruction in the case of the race. These modes are: (1) the pre-æsthetic, meaning an experience in which the perceptual and the constructive processes are unified in terms of pure feeling. The characteristic products of this type of æsthetic experience are the spontaneous myth and the fairy tale; (2) the quasi-æsthetic or the play-consciousess in which illusion abounds but in which there is the least attempt at idealization; (3) the æsthetic or period of conscious art-construction. These three types of æsthetic experience reflect three modes of æsthetic theory: (1) the pre-æsthetic in which the æsthetic and the theory of the æsthetic are not distinguished; (2) the quasi-æsthetic in which while the æsthetic is distinguished it is referred to another type of experience for evaluation and explanation; (3) the æsthetic or that type of theory in which the æsthetic is recognized as a distinct type of experience with its own problems, processes and methods, and as having a distinct place and function within the whole of experience.

The Desire for Continued Experience. J. F. MESSENGER.

The paper was suggested by a line in Browning's 'The Last Ride Together' quoted by Professor Royce in his 'The World and the Individual.' In this the lover expresses the wish that his present moment of supreme delight might last forever; he wants 'the instant made eternity.' The intensity of the desire to continue the experience forever is due to his knowledge that it actually will be short. The fleeting character of experience is one of the elements that give it value to the subject who has it. Experience, being a time process, is subject to the limitations of time, and, that being the case, all arguments for an absolutely endless experience are futile and based upon an instinctive tendency to avoid destruction and to somewhat prolong agreeable conscious processes. In discussions about immortality the important thing is to keep in mind the distinction between endless experience

and eternal existence. Experience is psychical phenomena (the word is used in the strict sense) and existence is a metaphysical problem. If the philosopher can find sufficient reason for eternal existence his faith may lead him to believe that that which ought to be *is*. But arguments for endless experience, though often interesting and clever, are of no more value, so far as arriving at truth is concerned, than were the old arguments about how many angels could dance on the point of a needle. The problem should be one of eternal values rather than one of logical proof.

The Proper Affiliation of Psychology; President's Address. J. MacBride Sterrett.

In the Library of Congress one finds the works on Empirical Psychology classified under the division of Physiology. Kant, in the second edition of his *Critique*, says that empirical psychology 'must be placed by the side of empirical physics or physics proper.' Hitherto it has been classed with the philosophical disciplines. Has there been any change in both the methods and the subject-matter to justify its breaking away from its traditional affiliation with philosophy?

Note is made of the discussion of the topic at the meeting of the American Philosophical Association at Harvard in 1907, — also of the fact that the American Psychological Association last year chose to meet in affiliation with the American Society of Naturalists in Chicago rather than with the American Philosophical Association at Cornell, — and of the fact that the A. A. A. S. puts in the program, Section H, Anthropology and Psychology. By common consent, rational psychology and the modern forms of the old introspective psychology go with philosophy. But how shall the new psychology be classified?

Submitting with a protest to the modern sectarian definition of science we can classify all forms of psychology as (1) the old, unscientific psyche-psychology; (2) the new scientific hypo-psyche-psychology.

Examination is made of structural, functional and genetic psychology as forms of the new science. It is found that their nature, aims, methods, and largely their subject-matter, are quite akin to those of the natural sciences.

It is found that consciousness as an entity or activity, and as the subject-matter of the science, is discarded.

It is held that all forms of non-psyche-psychology should be affiliated with the natural sciences. Kant is quoted on the subject from both the first and second editions of his *Critique*. Again, the new

science is distinguished from the other philosophical disciplines in being a causal rather than a normative science.

A plea is entered for the old introspective psychology as the logical form of any psychology — a plea for its work, life and title. If the old psychology be termed *metaphysics* the new science may well be termed Hypo-psychics.

(This address will be published in full in the PSYCHOLOGICAL REVIEW, Vol. XVI., No. 2, March, 1909.)

Discussion: The Proper Affiliation of Psychology: With Philosophy or the Natural Sciences.

JAMES GIBSON HUME. — Philosophy and psychology are affiliated in the Southern Society, and in the University of Toronto we do not divorce them.

Certain ultra-scientific psychologists, identifying philosophy with obsolete medieval metaphysics, naturally do not wish any affiliation. They can provide for philosophy under the sub-division 'Psychology of illusions and aberrations.' 'Psychology without a soul' means psychology without metaphysics. We may get along without medieval quibblings about occult essences. Pre-Kantian philosophy repudiated and refuted this dogmatic analytic method, Kant and his successors developed a better method and a more adequate metaphysic. It is as legitimate to distinguish modern philosophy from medievalism as it is to distinguish chemistry from alchemy, astronomy from astrology.

If the soul in question is the one David Hume could not 'catch,' the 'simple substance' demolished in Kant's 'Paralogisms,' we can get along without it also. But Kant reinstated another self or ego in his 'unity of apperception' and 'practical reason,' an organizing function within experience. This we cannot afford to lose. If we have a self within experience we do not need a second one beyond it. Those who are most vigorous in repudiating metaphysics usually reject idealistic metaphysics and adopt materialistic metaphysics instead. A mechanical explanation allows for no distinction between good and evil; it also takes away the distinction between true and false, fact and fancy; as each so-called fancy is as necessarily determined, it is therefore as legitimate as any so-called fact. This destroys science. Hence, materialistic metaphysics ought to be as obsolete as medievalism.

A state of consciousness may be dealt with abstractly, scientifically, and atomically, nevertheless in actuality it is an integral part of a continuum of living, synthesizing, conscious process.

Philosophy and psychology are really complementary. They deal with the warp and woof of the same undivided concrete human experience. Psychology turns special attention to the content and its analysis, philosophy to the organization or synthesis of this same content. Hence, psychology without philosophy is blind, philosophy without psychology is empty.

Experimental psychology has a perfect right to be ranked with the exact sciences; it shares with mathematics the work of making other sciences more exact, nevertheless it is closely bound up with philosophy. Both start from the same data of directly given actual human experience and on this common ground overlap. Further, the philosopher must cultivate the psychological soil if he would gather philosophical fruit; and the psychologist, after getting his scientific results, if he would interpret their meaning must philosophize.

George Trumbull Ladd. — It seems to me that psychology may properly become affiliated, or come into brotherly relations, with every form of science where there is a promise of mutual helpfulness. If we look upward to philosophy, we see that psychology has very special relations with it. These relations I have tried to express by calling psychology the proper 'propædeutic' to philosophy. By this I mean that the endeavor to solve the more difficult and deeper problems connected with a theory of the nature and development of the mental life, leads us straight to all the main problems of philosophy, as the supreme form of reflective thinking. Besides, there is no other practical introduction, or discipline preparatory to philosophy, which equals the study of psychology.

If now we look downward and outward we see how psychology may properly become affiliated with all the physical and natural sciences. With the strictly chemico-physical sciences, its affiliations are more remote and indirect, and are chiefly through psycho-physics, physiology, and the so-called anthropological and sociological sciences, of which psychology itself is, perhaps, the most important part. These all contribute to our knowledge of the conditions under which, the environment in the midst of which, and the efficient secondary causes in response to which, the life of the mind begins and develops. For example, psycho-physics may claim the whole territory in which lies the complex science of how the different qualities and intensities of nature's forces arouse, control, and determine the character of the history of the evolution of mind.

But when we have said all this by way of cheerful concession, and even grateful acknowledgment, to these sciences for their help, we

have by no means the right to surrender an independent sphere and special, high importance to psychology, as properly understood. For a true psychology never is, and never can be, anything less than that science which deals with the description, and explanation, and theoretical construction, 'of the facts of consciousness, *as such*' — that is, as facts of consciousness. It is in *these* facts that psychology finds its data. It is *these* facts which the science aims to explain and interpret in terms of a defensible theory of the mind's true nature and actual life of development. If now we examine the claims of physiology, or biology, to absorb and dominate psychology, rather than affiliate with it properly, we find that these sciences are in certain parts — as, notably, the so-called physiology of the sense-organs, and of the central nervous system, — largely themselves borrowers from psychology.

In this connection I wish to protest against the current use of such words as 'the subconscious,' or 'the unconscious,' and the accompanying attempt to discredit the value and uses of self-consciousness and introspection in psychology. The truth is that these phrases stand for a *purely* negative conception, a negation of all attempt to think or to know. Such words as 'infinite' and 'absolute,' when properly used, are never 'purely' negative conceptions. An infinite line, *quoad* line, is as much a line as is one a foot or a yard long. And I am simply amazed at the speaker or writer who imagines himself to be exploiting science when he is telling, in terms of consciousness, how the world would seem to a conscious seer of its processes, when as yet no sight, no seer, no consciousness were existent. Surely, here is the place for an invincible agnosticism.

It is doubtless somewhat disturbing to see how, at the present time, psychology as properly understood and properly affiliated, is being in certain quarters discredited and derided as being quite too 'old-fashioned' to claim the attention of the well-equipped, modern scientific man. But we old-fashioned fellows must continue in our effort to affiliate with all these helpful sciences, while not relaxing our grasp upon our own proper science; and bear with patience and good nature all our rebuffs. Those who are somewhat excited and even mentally awry over the triumphs of the so-called 'new psychology' will recover in time. And, indeed, there is after all only the same old human mind, which may be studied, however, with the help of many new affiliations.

(The abstracts of papers read at the joint session with the American Psychological Association will be found on pp. 45–48 of this number of the BULLETIN.)

PSYCHOLOGICAL LITERATURE.

CALCULUS OF PROBABILITY.

Le calcul des probabilités et la méthode des majorités. EMILE BOREL. Année Psychologique, 1908, XIV., 125–158.

The procedure of regarding the views expressed by the majority of a group as practically true for this group, is called the method of majorities. It is best illustrated by an example given by the author. The photographs of 40 children, of whom 17 were normal and 23 backward, were shown to 20 subjects, who had to state whether the picture represented a normal or a backward child. The percentages of correct judgments varied from 67 to 92 per cent. and their average was 78 per cent. From these data alone one may conclude that the pictures — or at least some of them — gave an indication as to the intelligence of the children, but this conclusion can be made considerably more definite by the application of the calculus of probabilities. The author starts by asking what results one would have to expect, if the judgments were mere guesses. The difference between the number of correct judgments which were given on 27 photographs (or approximately two thirds of all the cases) and the number of correct judgments which one would obtain by random guessing, is so great that it cannot be attributed to chance, whereas the judgments on the remaining 13 pictures are such that they may be a coincidence due to random guesswork. From this one must conclude that in two thirds of all the cases a certain influence was at work which tended to produce correct judgments, and it is only reasonable to suppose that this was the inspection of the pictures which gave some indication as to the intelligence of the person represented. Since no such influence can be shown for the remaining third of the pictures one must conclude that traces indicating the intelligence were absent in these pictures.

A further application of this method is made in a study of the relation of the form of the hand to intelligence. Pictures of the hands of children were shown to different observers, who had to decide whether the hand belonged to a male or a female, and whether the child was bright or dull. The agreement of the judgments is not as well marked as in the first example, but here also it is possible to

show an influence which determines the judgment. Binet made the hypothesis that the child is judged stupid if the thumb is short and ugly, whereas it is judged intelligent if the thumb is long and slender. This hypothesis is confirmed by further experiments, in which the observers had to base their judgment on this criterion exclusively. The calculus of probabilities thus enables one to show the presence of a cause, but it does not give any indication as to what this cause may be. A hypothesis as to the nature of this cause must be the result of experience and must be verified by further experiments, and here again the calculus of probabilities enables one to form a judgment as to the value of the hypothesis. Mathematical deductions are only the connecting link between two experiments, but this part of guiding the investigation is, though modest, of the highest utility.

The bearing of Professor Borel's deduction on the questionnaire method is obvious, and it may be hoped that his principles will give to this method the precision and elegance which have hitherto been lacking in some of the investigations using the questionnaire. The author's views about the rôle which mathematical reasoning may play in psychological experiments are sound and in perfect agreement with the spirit of statistical investigations. The demonstration that certain events are or are not such as they probably would be if they were chance events warrants the conclusion as to the presence or absence of a knowable cause, but does not give an indication of what this cause may be. This is the way of reasoning applied in all such cases ever since Laplace's demonstration that the orbits of the planets are not the work of chance. Borel's analysis of the method of majorities has the merit of reducing a method which was rather doubtful and led to loose results, to sound and well-established principles.

The author tries to apply his ideas to the method of right and wrong cases and uses for illustration the example given in Titchener's *Manual* ('Student's Manual,' p. 107), combining the results for the two time orders. He imagines a set of results similar to these, but which was not obtained from one individual but from a group of 100 individuals, each one of which gave a judgment on the comparison of the standard with the seven comparison stimuli, and tries to determine the collective sensitivity of the group. After having determined the point of subjective equality as that intensity of the comparison stimulus on which 'greater' and 'smaller' judgments are given in equal number, the author defines the upper and lower threshold as those intensities of the comparison stimulus for which one can conclude with a high probability that the standard is smaller or greater than the comparison stimu-

lus. These values are found by interpolation. The difference between Titchener's results and the results obtained by the author is considerable. The author sees that the cause of this discrepancy is a difference of the definition of the threshold, and explains it by his intention to determine the collective, not the individual sensitivity as Titchener does.

Borel's definition of the threshold is closely related to the one given by Scripture, which is even a little more definite in so far as Scripture asks for a certain high probability (the so-called statistical certainty) with which certain judgments may be expected. Leaving aside the objection that the notion of collective sensitivity is not very well defined, we certainly could not expect to determine it by other means than individual sensitivity. Here the author misses an important point apparently on account of his not being thoroughly conversant with the problems of psychophysical measurement. The fundamental definition of the threshold is the one supplied by the method of just perceptible differences, and no measurement of the accuracy of sense perception is acceptable unless the relation of the proposed measurement to the result of this method is shown. The difficulty of the method of constant stimuli lies, therefore, in part in the method of just perceptible differences. There are very numerous possibilities of defining the threshold so far as the method of constant stimuli is concerned, but since it was demonstrated that the method of just perceptible differences determines the interval inside of which the judgments 'greater' and 'smaller' have probabilities smaller than one half, no measurement of the accuracy of sense perception can be accepted unless it uses this quantity or quantities related to it.

In the course of his argument the author calls Titchener's calculations 'rather long and very correct.' These words, of course, refer not only to the numerical calculations but also to the algorithm of Müller's method of constant stimuli. The deductions in Müller's method are perfectly correct except the formula for the determination of the weight of the observation equations, which, however, is not given in Titchener's *Manual*. This formula is incomplete and the numbers in the table of Müller's Coefficients of Weights (Titchener, *loc. cit.*, p. 101) are false, as the eminent mathematician certainly would have seen had he looked into this matter.

F. M. URBAN.

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BOOKS RECEIVED FROM JANUARY 5 TO FEBRUARY 5.

Die Kindersprache. C. and W. STERN. Leipzig, Barth, 1907. Pp. 394. M. 11.

Erinnerung, Aussage und Lüge in der ersten Kindheit. C. and W. STERN. The same, 1909. Pp. vi + 160. M. 5.

Report of the Commissioner of Education (to June 30, 1907). Vol. II. Washington, Gov. Print. Office, 1908. Pp. 523–1214.

Physiological and Medical Observations among the Indians of Southwestern United States and Northern Mexico. Bureau Amer. Ethnology. Washington, Gov. Print. Office, 1907. Pp. x + 460.

Mélanges d'Histoire des Religions. H. HUBERT and M. MAUSS. Paris, Alcan, 1909. Pp. xli + 236. 5 fr.

Premier Congrès international de Psychiatrie, de Neurologie, de Psychologie et de l'Assistance des Aliénés, Amsterdam, 2–7 Septembre, 1907. Amsterdam, de Bussey, 1908. Pp. lx + 934.

The Psychological Phenomena of Christianity. G. B. CUTTEN. New York, Scribners, 1908. Pp. xviii + 497.

Introduction to the Genetic Treatment of the Faith Consciousness. (Diss. J. H. U.) W. W. COSTIN. Baltimore, Williams and Wilkins, 1909. Pp. 47. $.65.

The Effect of Constant Stimulus upon Touch Localization. L. A. LURIE. (Univ. of Cincin. Studies. Ser. II., Vol. IV., No. 1.) Cincinnati, Univ. Press, 1908. Pp. 49.

National Education Association—Journal of Proceedings and Addresses of the Forty-sixth Annual Meeting, held at Cleveland, Ohio, June 29–July 3, 1908. Winona (Minn.), Publ. by the Assoc., 1908. Pp. xii + 1251.

The Psychology of Singing. DAVID C. TAYLOR. New York, Macmillan, 1908. Pp. xix + 373.

Recherches expérimentales sur le dessin des écoliers de la Suisse romande. E. IVANOFF. Genève, Kündig, 1908. Pp. 64. Fr. 3.

Expériences sur le rôle de la récitation comme facteur de la mémorisation. D. KATZAROFF. (Repr. fr. Arch. de Psychol., VII., 225–258.) Genève, Kündig, 1908. Fr. 1.25.

Die Methoden der tierpsychologischen Beobachtungen und Versuche. E. CLAPARÈDE. (Repr. fr. Ber. ü. d. III. Kongress f. exper. Psychol.) Leipzig, Barth, 1909. Pp. 37.

NOTES AND NEWS.

THE second International Course for Legal Psychology and Psychiatry will be held at Giessen, Germany, April 13 to 18. The 'course' will be under the direction of Professor Sommer (Giessen), with the coöperation of Professors Mittenmaier and Dannemann (Giessen) and Professor Aschaffenburg (Cologne).

THE Neurological Institute of Frankfort-on-Main has arranged, in connection with the Frankfort Special Classes (Hilfschüle), a two-weeks course in 'Problems concerning Feeble-minded and Psychopathic Children,' to be given the latter part of June. Scientific research, clinics, psychology, education and methods, and forensic questions will be the subjects of lectures and courses by specialists. A number of institutions will be visited. The course is intended for those who are professionally engaged in this work or interested in it, or who wish to prepare for it. The detailed program will appear in the spring. (*Committee:* Dr. H. Vogt, Neurologisches Institut; Rector A. Henze, Wiesenhüttenschule.)

WE note with regret the death on December 31 of Dr. J. P. Gordy, professor of the history of education in New York University and author of several works on psychology.

WE have received the announcement of a new journal, *Rivista di Filosofia Neoscolastica*, to be edited by G. Canella and A. Gemelli (quarterly, beginning January 15, 1909: Florence, Libreria Editrice Florentina).

THE date of the International Congress of Psychology during the coming summer has been fixed for August 3–7.

ANNOUNCEMENT.

The REVIEW has in preparation the matter for a 'Darwin' issue, devoted to Charles Darwin's influence upon the mental and moral sciences and philosophy. It will take the place of one of the regular issues (either May or July).

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THE

PSYCHOLOGICAL BULLETIN

PROGRESS IN CHILD AND EDUCATIONAL PSYCHOLOGY.

BY PROFESSOR M. V. O'SHEA,

University of Wisconsin.

Productivity in these fields seems to be increasing at the present moment more rapidly in Germany than anywhere else. This is shown partly in the establishment of magazines devoted to the exploitation of new conceptions of child development in either its theoretical or its practical aspects, and partly in the printing of numerous monographs treating of some phase of child or educational psychology. With us there is a steady augmentation in the output of literature relating to the development and training of children, and the principles of education viewed from the psychological standpoint. The suggestion is frequently heard among us now that we are in need of at least two new magazines which should be devoted exclusively to child and educational psychology, and the application of the new views to the detailed processes of teaching.

It is worthy of remark that the greater part of the literature treating of child development and training is being produced in response to the demands of educational organizations of one sort or another. A considerable portion of it is being written with the express view of guiding teachers and parents in the instruction and management of children in and out of school. It will be apparent, then, that this literature is very largely of a 'practical' character. The writer of these notes, in running over the book and magazine literature on child development which has appeared since the special BULLETIN two years ago, has estimated that at least five-sixths of it was written directly for teachers, for parents, for instructors in religious schools, or for women's clubs. Those who are charged with the care and culture of children are to-day asking for help as they have never before

done in any age or country perhaps; and their call is being responded to by persons with the most diverse training and experience in respect to the problems which they undertake to solve. What many of them write is ethically and inspirationally good perhaps (though there are exceptions), but it is scientifically of little or no value. It is based upon sentiment, rather than upon exact knowledge of the native tendencies of the child, or his needs in order that he may attain adjustment to the world of men and things in the most effective way.

It is quite significant that those who are engaged in training the young, whether they be teachers or parents, seem to be much more interested in concrete data pertaining to child life than in logical analyses of ends, values, and processes in education. It would be next to impossible to induce a parents' organization, or a woman's club, or even a typical teachers' association, to study some of the late books on the principles of education, whereas great numbers of such societies everywhere are reading books that discuss the traits and needs of children in a direct, close-at-hand, familiar manner. This latter class of books, while in reality most of them are more or less psychological, yet they do not attempt broad and abstruse generalizations in respect to mental constitution or function. Some of them never refer to the formal processes of sensation, perception, reason, etc. Instead, they treat in a descriptive and objective way (and often in a superficial way) topics such as interests in childhood; the emotional development of children; the social nature of the young; truthfulness among children; obedience; the trend of the 'teens; adolescent love, etc. The analytic and systematic treatment of psychological processes does not seem strongly to attract persons with practical interests, even when 'applications' to the work of training are attempted. To the present writer this is a rather wholesome sign, since it is not easy to see how the formal exposition of psychological principles, which is so common in educational as well as in psychological texts, can be of special service to the art of teaching in any of its forms.

Last summer the writer of these lines listened to a psychologist deliver a few lectures in his field to mature teachers. He devoted the first half-hour of the course to a general criticism of the attempt to make psychology help teaching ; and then he proceeded to spend the rest of one week in trying to instruct his auditors how to conduct their work effectively from the psychological standpoint. At the end of the week it was apparent that the lecturer had expressed a profound truth, so far as he was concerned, in the first part of his course. What he taught during the week was probably sound psychology—certainly

it seemed to be in accord with the views of at least one of the leading American psychologists, which was as much as could be expected in the present state of psychological thought. But at the end of the week his class seemed to feel that there was no application to their work which they could make of anything he had said to them. So far as they were concerned the whole thing was mainly verbal. The instructor spent his time expounding the so-called laws of sensation, perception, memory, reason, etc.; but what all he developed had to do with training a living human being, or teaching him cube root, say, or preventing him from whispering to his neighbors in the schoolroom, or encouraging him in doing so if this should be essential to his development, was not in the least apparent.

The present writer came away from those lectures feeling that the lecturer had not the remotest notion of how to apply psychological theory to any of the actual detailed problems of the typical classroom: and yet he was using up the time of teachers for one week, with the result probably that they were rather hindered than helped by his instruction. What was heretofore facile in their art, and more or less instinctive and automatic, would be likely now to become in some measure a matter of conscious effort, and this would be to the detriment of efficiency in practice. These teachers would be feeling that as a matter of conscience they ought in some manner to apply these statements they had written down about the mind, and their attention would in consequence be distracted from the concrete situations before them where their own experience would probably be of chief importance to them. It is a notorious fact that psychologists of the type of this lecturer are in some cases most ineffective teachers. Their familiarity with mental function does not extend to the manifestations thereof occurring under educational stimulation.

As we have not yet devised ways and means for the efficient investigation of the psychology of education considered in all its aspects, so many of us have not yet learned to teach what we do know so that it may affect practice in a vital way. The two things probably go together. If those who expound the psychological foundations of teaching could and would deal in a naturalistic way with actual educative processes as they must occur in the normal development of a human being, the results of such exposition could probably be taught to persons who are making preparation to teach so that their practical bearing would be apprehended. We may as well give up the notion that the study of formal analyses of adult mental function will be of substantial aid in the advancement either of educational theory or of effective practice.

The outlook is brighter in child than in educational psychology, partly because those who are interested in the former field have kept clear of a more or less formal method of procedure such as many of the educationists writing from the psychological standpoint have inherited from the static psychologists from whom they are descended. The students of childhood have come closer to the objects to be investigated than have the educationists of the conventional sort. Their work is more vital, less verbal, more to the point. With all the disadvantages arising from the lack of training of many of them, and from their exuberant enthusiasm and their crude methods, they still accomplish more of real worth than the highly-schooled but technical and formal educationists of the type indicated.

However, it is cause for rejoicing that the principles of education are being developed ever more largely from the standpoint of contemporary concrete and dynamic psychology, in which vital facts are of greater moment than logical system. But while appreciating the advances we are making in treating education as a natural science, still when we compare the little we have achieved with the vast amount left to be done it is not so easy to maintain an optimistic attitude. It would be unsafe to dogmatize in respect to the extent to which we have succeeded in elaborating educational principles according to scientific method, but yet one will run no risk in saying that only a small part of the contemporary literature of education, presented from the psychological standpoint, can be said to have permanent value. Many educational books (not all of them, happily) still treat in one small volume the entire subject of educational ends, values, and processes; and in consequence thereof the treatment is found to be general and more or less verbal. Special studies of merit have been made upon particular phases of education, as in the teaching of reading, for instance; but this sort of work, so much needed at present, has hardly yet got started. There are vast fields of educational theory and practice that have not yet been entered by a psychologist equal to the adventure.

How many competent psychologists, in good and regular standing at home or abroad, have shown any real knowledge of or intelligent interest in the problems of development and education? The fingers on both hands would probably suffice to enumerate them. It is true that a greater number than this have thrown out incidental remarks about 'child study' and teaching, but such observations have not shed much light on the problems in these fields. How many laboratories are there in the world devoted to the study of educational processes accord-

ing to psychological method, and properly equipped to undertake the work in a large and effective way, giving proper attention to normal as well as to sub-normal children? It is doubtful if there is in the whole world one such institution, equipped with proper appliances and well-trained men for psychological investigation, *and with children in every stage of educational development available for observation and experiment.* There are laboratories and competent men in a number of places at home and abroad, and children who are being utilized for experimental purposes in other places; but the writer does not know of any place where the two are brought together, constituting a single unified investigating institution; nor have we forgotten the Practice School at Jena, the laboratories at Crevalcore, Paris, Lyons, and Geneva, the Speyer School in New York, or the Elementary School in Chicago. Of course, educational psychology can be advanced more or less successfully in other ways; but it can never be developed as it should be until men make investigation their main business, and are provided with the essentials thereto, which include *pupils of every type who can be used for experimental purposes.*

THE PSYCHOLOGY OF SCHOOL PRACTICE.

BY PROFESSOR W. C. BAGLEY,
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From the point of view of both educational theory and school practice, one of the most vital desiderata is an accurate investigation of specific methods of instruction and training. Next to the need for a scientific study of values, this is probably the field that presents the most imperative demands for immediate investigation. The record of the past two years includes a few important studies in this field, but, taken all in all, the surface has hardly been scratched as yet. Burnham,[1] whose careful and painstaking work always merits commendation, has reviewed the history of teaching spelling and the psychology of spelling, summarizing in a comprehensive way the numerous German investigations in this field. Witmer[2] has studied a special instance of poor spelling from the point of view of clinical psychology. Work of this sort upon extreme and abnormal cases can hardly fail to throw valuable light upon normal problems in the technique of teaching, and this instance does not prove an exception to the rule. The theory that good spelling is a Heaven-sent gift does not find favor in Witmer's eyes. He admits the possibility that some brains may be congenitally incapable of developing the normal visual functions of language, and that such cases, *if they exist*, constitute "a condition exactly analogous to one that is frequently found with respect to the function of hearing called musical audition." "It may be that perfectly normal children lack the spelling eye, as other children lack the musical ear, and that the former can be as little trained to spell correctly as the latter to play or sing; but if such children exist, I have yet to meet the first clear case. My experience leads me always to examine the eyesight of a bad speller who is otherwise free from mental or physical defect and who has enjoyed satisfactory school training. . . . I have found in such cases that the chronic bad spelling is invariably associated with some form of defective vision. I am not convinced, however, that bad spelling is necessarily caused by the eye defect."

[1] W. H. Burnham, 'The Hygiene and Psychology of Spelling,' *Ped. Sem.*, XIII., pp. 474–501.

[2] L. Witmer, 'A Case of Chronic Bad Spelling—*Amnesia Visualis Verbalis*, Due to Arrest of Post-Natal Development,' *Psych. Clinic*, I., pp. 53–64.

It seems reasonable to assume that the more exact and permanent contributions to the psychology of specific methods of instruction must start with the rough results of accurate experience in the class-room, and, sifting the grain of these from the chaff, arrive at some tentative hypotheses which may then be subjected to more accurate experimental test. It is gratifying to note that there is a disposition on the part of the editors of the technical and scientific journals to admit to their columns this empirical type of material. Miss Coppersmith[1] has recently published an account of the methods of teaching English, together with specimen class-compositions. Meyers[2] has presented a valuable comparative analysis of the methods of moral training employed in American, English, French, and German schools. Gibbs[3] has treated the pedagogy of geography in a clear and comprehensive manner, analyzing the various courses of study and methods of teaching, and summarizing the psychological studies of children's interests that bear upon the teaching of geography.

More indirectly related to the problem of educational technique is the type of investigation that is represented by Cleveland's study of the psychology of chess.[4] Analytic work of this sort, based upon controlled introspection, must needs prove very valuable, especially if a number of such studies can be compared and the general principles induced.

The field of educational psychology that has perhaps been most thoroughly subjected to accurate investigation is that which relates to the functions of memory and to economy in learning. The American laboratories are doing some very important work in this field, although, thus far, the Germans appear to have the advantage. While the really practical contributions to the solution of educational problems are limited to a comparatively few suggestions regarding methods of memorizing, and especially the optimal periods for repetitive exercises, the technique of experimentation is being very rapidly refined and improved, and results of far-reaching educational significance cannot be far distant. Bergström's critical summary[5] demonstrate the thorough-

[1] Mary E. Coppersmith, 'Suggestions on the Teaching of English,' *Ped. Sem.*, XIII., pp. 461–473.

[2] G. E. Meyers, 'Moral Training in the School,' *Ped. Sem.*, XIII., pp. 409–460.

[3] D. Gibbs, 'The Pedagogy of Geography,' *Ped. Sem.*, XIV., pp. 39–100.

[4] A. A. Cleveland, 'Psychology of Chess and of Learning to Play It,' *Am. Journ. Psych.*, XVIII., pp. 269–308.

[5] J. A. Bergström, 'Effect of Changes in the Time Variables in Memorizing, together with Some Discussion of the Technique of Memory Investigation,' *Am. Journ. Psych.*, XVIII., pp. 206–238.

ness and exactness with which this important work is being prosecuted, and Kuhlmann[1] has recently presented in the BULLETIN an admirable report on the present status of the memory investigations, which indicates at once the gratifying progress that has already been made and the complicated and puzzling problems that still await solution.

Ordahl's study of rivalry[2] suggests another corner of the field of educational psychology that fairly bristles with problems. In reviewing the history of school incentives, Ordahl finds that the oldest means of persuasion is the rod, and that 'the next higher step was taken when rivalry is in part or in whole substituted for brute force.' The final stage, he tells us, is the present, in which many motives are appealed to, and rivalry is less a conscious factor 'but nevertheless inherent in the system.' In fact, notwithstanding the present tendency to discount emulative incentives, he holds that rivalry, 'as an elemental impulse in life,' cannot be neglected in education. "Instead of being looked upon as a means to discipline, it should be considered in the light of development, and given a chance to expand into its fullest and ripest stage — the desire for superiority." Rewards and prizes are endorsed, but they should be adapted to the period of development represented by the child, and the factor of self-emulation can and should be made more and more important as age advances. His plea for a careful experimental investigation of the relative merits of rivalry and coöperation at the various stages of the educational process will be heartily echoed by all who have become somewhat weary of the contemporary efforts to solve this problem once and for all time by *a priori* arguments.

The controversy over 'formal discipline' goes merrily on, but the strife is now within the camp of the psychologists and there is a gratifying absence of the unsubstantiated dogmatizing that once characterized the discussion. The reaction which was initiated against the older doctrine of formal discipline by the Herbartians, and which reached its height soon after the publication of the Thorndike-Woodworth experiments, seems now to have given place to a counter-reaction which bids fair to rehabilitate the doctrine — albeit with so many modifications that its older adherents will probably not recognize it as the same thing. Following in the wake of German experiments on the transfer of training in the field of memory, Winch, in England,

[1] F. Kuhlmann: 'The Present Status of Memory Investigation,' PSYCH. BULLETIN, V., pp. 286–293.

[2] G. Ordahl, 'Rivalry: Its Genetic Development and Pedagogy,' *Ped. Sem.*, XV., pp. 492–549.

has recently undertaken a series of investigations[1] which issue in results very similar to those of Ebert and Meumann. Winch tested pupils ranging in age from eleven to fifteen years and averaging thirteen years. Instead of testing the same group before and after training, and so determining the influence of the training, Winch introduced a new method of making this determination. He divided the pupils into two groups of approximately equal ability in memory, and containing the same number of pupils. Both groups were tested as to their ability to memorize a passage from an historical reading book, this ability being measured by the amount that could be reproduced immediately after fifteen minutes of study. Members of the first group were trained during the next week or two in memorizing poetry, the members of the second group being occupied at the same time with problems in arithmetic. After the period of training was completed the two groups were brought together and subjected to a second test in memorizing a selection from an historical reader. It was found that the first group, who had received the training in memorizing poetry, did much better in this final test than the second group, who had missed this training. The author comes to the following conclusion: "Improvement gained by practice in memorizing one subject is transferred to memory work in other subjects whose nature is certainly diverse from that in which the improvement was gained."

It will be noted, however, that the nature of the subject-matter is not so diverse as to exclude entirely the operation of 'identical' elements, nor is the difference between the two groups in memory capacity at the close of the test so great that one needs to assume a 'general' function of memory to explain the improvement. The factors emphasized by both Müller and Woodworth in criticism of the Ebert-Meumann experiments apply with even greater force to the conclusions of Winch.

Coover and Angell[2] have attempted (and with some measure of success) to select for experimentation a set of capacities in which the troublesome factor of identical elements could be much more thoroughly eliminated than in either the Ebert-Meumann or the Winch tests. Their first series of experiments was undertaken to determine the influence of training in auditory discrimination upon the capacity to discriminate brightness differences. Out of four subjects trained in

[1] W. H. Winch, 'The Transfer of Improvement in Memory in School Children,' *Brit. Journ. Psych.*, II., Part 3, pp. 284–293.

[2] J. E. Coover and F. Angell, 'General Practice Effect of Special Exercise,' *Am. Journ. Psych.*, XVIII., pp. 329–340.

the discrimination of sounds, three showed that some of this training could be carried over to the discrimination of brightness. A second series was undertaken to determine what influence training in sorting cards would have upon ability to react properly upon a typewriter to certain letters which were exposed to the subject's view. It was found that the time of the typewriter-reaction was decreased by the training in sorting cards, but that the errors were increased. The authors explain the transfer of training in the first series as a divesting of the essential process of its unessential factors, a freeing of judgments from illusions, and the attaining of a more uniform state of attention which is less than the maximum. The more economic adaptation of attention is especially emphasized. The improvement discovered in the second series is explained by the authors as due (1) to the formation of a habit of reacting directly to a stimulus without useless acoustic and motor accompaniments, which results (2) in an equitable distribution of attention to the various possible reactions so as to be about equally prepared for all; and (3) the consequent power of concentrating the attention throughout the whole series without distraction.

Just how far 'identical elements' are excluded in these experiments, it is difficult to determine. *Objectively* the conditions seem clearly different, but *subjectively* there still remain all sorts of possibilities. Wherever something in a new situation gives mind a 'cue' to a reaction that has been trained in an apparently different situation, it would seem plausible to believe that the adjustment to the new situation will be better because of the older training. Obviously the 'cue' *may* operate on the plane of habit, in which case, of course, the situation is in no significant way different from that in which the training has been acquired. But it is not cases of this type that cause the trouble in the formal-discipline controversy. It is rather those cases in which the training shows a stubborn tendency *not* to spread. Here the saving factor is the conscious factor; unless one is conscious of an identity, there is no guarantee that special training in one field will be carried over into another field.

This solution of the problem is strongly suggested by Ruediger's tests on the transfer of training in neatness through a conscious process. Some earlier experiments had indicated that children trained in habits of neatness and accuracy in arithmetic did not transfer this training to written work in language and spelling under conditions which eliminated, as far as possible, a conscious recognition of identity in the different situations. In fact, the papers in the latter subjects grew worse

as the arithmetic papers improved. Ruediger[1] repeated the experiments, again with a particular emphasis upon neatness in one school subject. In the remaining subjects nothing was said about neatness, but, during the exercises in which the specific training was undertaken, it was attempted, by various talks and discussions, to develop an *ideal* of neatness among the pupils. The results indicated very clearly a marked transfer of training to the unemphasized phases of the school work, although the gain was, naturally, greatest in the subject emphasized. The significant feature of these tests lies in the fact that the children tested by Ruediger were seventh-grade pupils, while the children subjected to the earlier tests in which no transfer was noted were third-grade pupils. It seems to be a reasonable inference that the older children generalized their experience much more readily, and detected in the various situations identical elements or 'cues' which the younger children missed entirely. That the addition of the emotional element will insure a greater likelihood of the 'cues' being detected in seemingly dissimilar situations can hardly be doubted.

If these conclusions are correct, the problem, from the practical point of view, is to make thoroughly conscious to the pupil or the student the virtues of the method which is employed and from which it is hoped that the 'discipline' will emanate. The view that, in some intangible fashion, different mental faculties will be trained into general efficiency is no longer tenable. The miracle may occur — and it may not. The closest approximation that we can make to an assurance of its occurrence is to work through the higher levels of consciousness — to fortify in every way an appreciation of method and not to be satisfied with a mere mechanical mastery of method. What this means in terms of teaching, Ruediger very clearly indicates.

[1] W. C. Ruediger, 'The Indirect Improvement of Mental Function Through Ideals,' *Educational Rev.*, XXXVI., pp. 364–371.

RECENT CHILD AND EDUCATIONAL PSYCHOLOGY.

I. IN GERMANY.

In a recent German periodical[1] Professor Max Meyer, of the University of Missouri, contrasts the lists of lecture courses in the various fields of applied psychology in Germany[2] with the activity in similar lines in this country. Of the 22 courses listed for Germany, only five deal directly with educational psychology.[3] Meyer estimates that at least three times as many courses of the same caliber were given in this country at the same time, to say nothing of the dozens of courses of a more elementary character given in American colleges, for which, he says — apparently overlooking the courses in the *Lehrerseminare* — no exact equivalent can be found in Germany.

From this comparison one might gain the impression that American teachers are better versed in educational psychology than are their German colleagues, but nothing, it seems to us, could be farther from the truth. The typical German teacher is far better trained in all phases of professional preparation than is the typical American teacher. In especial, the numerous teachers' associations with their organs of publication and their lecture courses bring it about that the latest contributions of expert investigators are in Germany quickly disseminated and assimilated by the body of teachers:[4] indeed, for the

[1] *Zeits. f. angewandte Psych.*, I., 1908, 470–2.

[2] *Ibid.*, p. 170.

[3] The work of Uphues at Halle, Stern at Breslau, Messer at Giessen, Meumann at Münster, Vogt at Göttingen, to which might be added the summer courses given by Brahn at Leipzig, and the numerous extension courses given especially by Stern and Meumann before societies of teachers.

[4] The *Allgemeiner deutscher Verein f. Kinderforschung* under Trüper's direction at Jena has a membership of 150 and maintains the *Zeits. f. Kinderforschung;* the *Verein f. Kinderpsychologie* under Kemsies at Berlin has a membership of 100 and is responsible for the valuable *Zeits f. päd. Psych., Path. u. Hyg.*, edited by Kemsies and Hirschlaff. There are also important child-study clubs at Mannheim and Dresden, while educational psychology is represented at the meetings of the *Gesellschaft f. exp. Psych.*, founded in 1904, and now under the leadership of G. E. Müller, and of the *Gesellschaft f. psych. Forschung*, meeting one section at Munich under Lipps and another at Berlin under Moll. In addition, an important *Congress f. Kinderforschung u. Jugendfürsorge* met for the first time in Berlin in 1906 under the leadership of Trüper and will meet at regular intervals in the future.

As a typical instance of this sort of activity in Germany a few words might

German teacher to fail to keep in touch with the advance of educational psychology would be considered suicidal. One may look in vain in this country for any such evidence of a teaching profession that is alive to the most recent scientific advances.

Again, in comparison with Germany we have in this country no such wealth of publications which deal with the direct or indirect applications of psychology to education: at least it would be difficult to find a parallel in our literature for such varied periodicals as the *Zeits. f. exp. Pädagogik*, the *Zeits. f. päd. Psych.*, the *Päd.-psychologische Studien*, Stern's *Beiträge zur Psych. d. Aussage*, or his *Zeits. f. angewandte Psych.*, Kraepelin's *Psych. Arbeiten*, Rein's *Zeits. f. Phil. u. Päd.*, and the several series of monographs edited by Ziehen and Ziegler, Meumann, Martinak, Ufer, Trüper, Rein, and Mann, not to mention the work of the Austrians.[1]

Yet again, there exists in Germany a body of specialists, much larger than in this country, who are concerned with the psycho-educational problems of school hygiene and of the education of defectives and the feeble-minded; these men keep well filled the pages of *Die Kinderfehler*, the *Zeits. f. Schulgesundheitspflege*, the *Zeits. f. päd. Psych.*, the *Intern. Archiv f. Schulhygiene*, *Die Hilfsschule*, and other periodicals, so that comparison with the limited number of the contributions to such magazines as *The Psychological Clinic*, *School Hygiene*, etc., is hardly needed to convince one that in these fields American are easily outnumbered by German investigators.

A concrete example of the manner in which the knowledge of the psychological expert is in Germany conveyed to the teacher is supplied in what is unquestionably the most important book that has appeared in educational psychology during the last two years, — Meumann's *Vorlesungen zur Einführung in die exp. Pädagogik u. ihre psychol. Grundlagen*, Leipzig, 1907. These two volumes of nearly a thousand pages, which are dedicated to the teachers' associations of

be said of the Leipzig *Lehrerverein:* this voluntary association of principals, school inspectors, and teachers, has purchased its own building of eight rooms (two lecture rooms, five rooms for experimental work and a library) at a cost of some $3,000 and maintains an *Institut f. exp. Päd. u. Psych.*, whose winter and vacation courses are filled to the membership limit, and whose work under Brahn's direction has aroused the active interest of Wundt, Wirth, and other Leipzig professors.

[1] We are pleased to record the prospective appearance in this country of a Journal of Educational Psychology, which will, it is believed, furnish a valuable channel for the publication of the results of experimental investigation in this and allied fields.

Königsberg, Frankfort and Bremen, represent a series of 18 lectures. In conjunction with his activity in editing such important periodicals as the *Zeits. f. exp. Päd.*[1] (beginning 1905) and the *Päd. Monographien*, and with his personal contributions to the experimental literature, these volumes stamp Meumann as the most prominent educational psychologist in Germany to-day. For these reasons we feel that a satisfactory account of recent German educational psychology (though not strictly limited to the last two years) may be secured by a presentation that is largely drawn from Meumann's volumes.

Scientific pedagogy employs in the main two methods, the psychological — *i. e.*, the familiar laboratory methods — and the pedagogical or didactic — *i. e.*, the experimental and statistical examination of the value of different methods of teaching. A fundamental principle of this movement is the recognition that the solution of all pedagogical problems must be made from the point of view of the child rather than from that of the adult.

We may first sketch a few of the results that have been obtained by the psychological method.

Important contributions to our knowledge of normal physical and mental development have been made by Dr. Lucy Ernst, in cöoperation with Meumann (growth tables for 175 boys and 175 girls, aged 8 to 15), and by Drs. Engelsperger and Ziegler. The correlation of physical and mental capacity has been investigated by these writers and by Rietz in Berlin, Bayerthal in Worms, Eyerich and Löwenfeld in Wiesbaden, and others. The results confirm the existence of periodic phases of accelerated and retarded development, extend our knowledge of these phases, and indicate a general correlation between intellectual ability and certain characteristic indices of physical growth, particularly head-circumference.

The work of David in Warsaw and of later investigators, especially of Matiegka, Ranke and Treitel, has demonstrated the existence of a similar periodicity in mental development, and emphasized the principle that the distribution of mental traits in the child is characteristically different from that in the adult.

Association and memory have received attention in Germany, particularly in connection with the study of the learning process, of economical memorization, and of the development of memory in

[1] Originally edited by W. A. Lay and Meumann under the title *Die exp. Pädagogik*. It may be of interest to call attention to the episode which, with the appearance of the fourth volume in 1907, led to the withdrawal of Lay on account, primarily, of the charges of Cordsen, who accused Lay of plagiarism in his *Exp. Didaktik* (see *Zeits. f. Psych.*, XLIII., 290 ff.).

school children. It is impossible to more than suggest the conclusions which flow from the work of Lobsien, Bernstein, Bogdanoff, Brahn, Ebert and Meumann, Pentschew, Pohlmann, Wessely, Winteler and others; thus it has been shown that memory develops unevenly; that retention is relatively good during the 10th to the 12th year, and relatively poor during the 14th to the 16th year, that emotional memory begins in the main at puberty, that children learn more slowly, demand more repetition, but forget less rapidly than adults, that many children leave school at a period when assimilative capacity is at its height, that the order of attainment of functional efficiency in memorizing differs with different mental contents, that memory for abstract verbal items develops side by side with memory for numbers, etc.

The study of specific capacities and talents and their utilization in mental development (*Begabungslehre*) is not so well advanced, and is occupied as yet mainly with the discussion of theoretical hypotheses and with methodological problems.

Though relatively little has been done with affective and volitional life, German investigators have not neglected the higher mental processes; imagination, linguistic development, esthetic development, and even ethical and religious development, are being studied by the experimental method.

The conditions of mental fatigue have been systematically investigated since the work of Bürgerstein in 1891 — witness the contributions of Laser, Friedrich, Kraepelin, Höffner, Ebbinghaus, and Ritter. The unreliability of Griesbach's esthesiometric test seems now to have been demonstrated to the satisfaction of all investigators. A large amount of factual material has been accumulated with regard to the effect upon fatigue of such conditioning factors as age, sex, rest-pauses, physical effort, mental effort (as in the various school studies), alcoholic beverages, etc.

The chief problem of the pedagogical method is the analysis of the type of mental activity that is demanded by the various school studies. In this field, to which Meumann gives the name experimental didactics, attention has been directed for the most part to observation-lessons (*Anschauungsunterricht*), reading, writing, spelling, number-work, and drawing; the work in the higher grades has yet to be studied systematically by the experimental method. The work of Goebelbecker, F. Schumann, and Zeitler has advanced our knowledge of the manner in which children learn to read, and bids fair to suggest important pedagogical principles; similar statements may be made of the study of handwriting. From the investi-

gations of Lay, Lobsien, and especially of Goebelbecker, supplemented by the observation of pathological cases, Meumann induces as a rule for the best method of learning to spell correctly: combine the sight of the new word with analytical copying of it, plus at least a whispered pronunciation of its constituent elements. The psychology of number is not yet so well advanced, but mention should be made of Lobsien's examination of the correlation between memory for numerals and arithmetical ability, and of Ranschburg's promising inquiry, the first article of which appears as this is written. In drawing, the earlier custom of simply collecting examples of children's drawings and culling from these a few generalizations has been superseded by more careful analytical and experimental work, notably by Meumann and Dr. Albien in recent numbers of the *Zeits. f. exp. Päd.*

Mention may be made here of the extensive investigation in Germany of the psychology of report or testimony (*Aussage*), due particularly to the zeal and industry of Stern. The investigations of Borst on the educability of the report, of Lipmann on the use of suggestive questions, and of Wolodkewitsch and others on the classification of ideational types in the report, have shown important pedagogical bearings. Here, again, is a province of applied psychology, which, save for some work by Münsterberg, has not been exploited in the United States.

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II. IN FRANCE.[1]

The publications on educational psychology and child study that have appeared in France and countries where the French language prevails, during the last three years, fall naturally into three groups: (1) books, (2) magazine articles, and (3) publications of laboratories and societies.

I. At the present time there are four principal centers for laboratory research in these subjects, two in France, one in Switzerland, and one in Belgium. The two laboratories in France are found in Paris and Lyons. The former, which was first installed in the laboratory of physiological psychology at the Sorbonne, has since become an annex of that laboratory, and is now housed in one of the public primary schools of the city of Paris. Its publications ordinarily appear either in the *Bulletin de la Société de Psychologie de l'Enfant*, or in the *Année Psychologique*. It includes a study of both normal and

[1] Translated by Professor F. E. Farrington, University of Texas.

abnormal children, but its investigations are primarily in the field of educational psychology. The laboratory at Lyons was established at the instigation of Père Beauvisage for the purpose of studying the local school children unsatisfactory in conduct or attainments, with the idea of discovering those pupils who might profitably be segregated in special classes.

The laboratory at Brussels finds its material in the institution for backward children of Dr. Decroly, and in the special school for abnormal children under the direction of M. Nyns.[1] The results are ordinarily published in the *Bulletin de la Société protectrice de l'Enfance anormale*. This is a center for medical and pedagogical observations rather than a laboratory for paidology. The paidological laboratory of M. Schuyten, which has been established by the municipality of Antwerp, where the Flemish language prevails, falls outside the scope of these notes.

At Geneva, the situation resembles that at Paris, for the pedagogical laboratory is joined to the psychological laboratory, and is under the direction of Dr. Claparède. Three years ago, a pedagogical seminary was added to this. The publications of this laboratory appear in the *Archives de Psychologie* of Claparède and Flournoy.

II. Practically up to the present time, magazine articles on these subjects have appeared only sporadically in France. Aside from the bulletins of the societies, some of the reviews devoted to psychology or pedagogy have from time to time published studies on the child and on educational psychology, as for example, the *Revue Philosophique*, *Revue Pédagogique*, and others. But within the last few years, only a single magazine has devoted itself exclusively to these questions, the *Educateur Moderne*, founded in 1906 by Dr. Jean Philippe and Dr. G. Paul-Boncour. This magazine was intended to afford a medium of expression for studies of physical education, school hygiene, biology and pedagogy in their mutual relations, and of abnormal children. The following are the titles of some of the more important leading articles that have appeared in this journal: 'The School Book,' 'Untruthful Children,' 'The Physical Education of Women and Children in Japan,' 'For and Against the Vertical Script,' 'Happel's Method of Gymnastics,' 'Paidology,' 'Language Difficulties of Abnormal Children,' 'The Educational Processes in Classes of Abnormal Children,' 'Instruction in Swimming in the Elementary School.' In spite of the measure of success attained, the editors have abandoned the

[1] For an account of this school of M. Nyns, see the *Proceedings of the National Education Association*, 1908, pp. 378–379. (Tr.)

publication of this magazine, which was primarily interested in pedagogical questions. Consequently, at the present time, neither in France, nor in the countries where French is spoken is there any publication which corresponds to the *Pedagogical Seminary*, or the *Educational Review*.

The societies organized to investigate these questions ordinarily work in connection with some laboratory. The two most important in France are the Society for the Study of Child Psychology, founded in 1900 by M. F. Buisson, and the Association of Doctors and Families for Improving the Physical and Intellectual Hygiene of the School, founded in 1902 by Dr. A. Mathieu. The former organization concerns itself with the psychology of the school. The larger part of the membership is made up of teachers, and the active workers in the society devote themselves particularly to investigating the means for estimating the mental ability of children, the best pedagogical processes to be employed with them, the method of diagnosing mental anomalies, and the like. The second society is more particularly interested in questions of school hygiene. It has devised a school record book with medico-pedagogical notes, very similar to that which Dr. Roux had adopted for use in the public schools of Nice. The society is likewise interested in the revision of the overburdened school program, in the measurement of fatigue among school children, in school furniture, and kindred topics.

The Society for the Protection of Abnormal Children was founded in 1902 by a group of Belgian physicians and educators, among whom we find the names of Dr. Demoor, Dr. Decroly, M. G. Rouma and others. This organization is interested more specifically in the protection and education of abnormal children, and it seeks to unify the forces working toward this end. Unfortunately these investigations are still diffuse and poorly organized, and the members of the group have published little. Better results are looked for when the educational bureau which the municipality of Brussels has organized under the direction of M. Nyns for the purpose of collecting all the available information that bears upon the education of abnormal children is in working order.

Finally, in connection with the organizations that devote themselves to the study of abnormal children, passing mention must be made of the medico-pedagogical clinic which was started in 1901 by Dr. J. Philippe and Dr. P. Boncour. At this clinic abnormal school children as well as backward or vicious children are examined both from the medical and from the educational point of view.

III. The books on these subjects published since 1906 may be divided into three categories: general treatises, treatises on educational psychology, and the investigations of abnormal children.

(1) *General Treatises.* — Among these, the following are especially worthy of mention: Leroy, *Vers l'éducation nouvelle ;* Van Overbergh, *La réforme de l'enseignement;* Ch. V. Langlois, *L'éducation aux Etats-Unis ;* P. Crouzet, *Maîtres et parents;* Déries, *Comment élever la Démocratie;* Mocquillan, *L'art de faire un homme;* Braunschwig, *L'art et l'enfant;* F. Allengry, *Psychologie et Pédagogie;* James, *Causeries pédagogiques* (the French translation of *Talks to Teachers*); Dufresne, *Nouveau cours de pédagogie;* Lalande, *Précis raisonné de morale pratique;* P. E. Thomas, *L'éducation dans la famille.*

In spite of the diverse environments from which these books emanate, they all show a community of interest. They emphasize the necessity of bringing about a closer relationship between the school and the home, of interesting the parents in the work their children are doing at school, and in making the latter educational as well as instructional centers. One and all demand that the school should no longer restrict its instruction to the mere subject matter of one or more programs, but that first of all it should teach its children to be upright men and good citizens. At the same time these educators demand a better adjustment of the curriculum so as to fit the social and economic conditions of the life in which the child must live; that the instruction should appeal less to the memory and more to the intelligence; in fine, that it should strive rather to develop the mind than to fill the memory. Furthermore, the school should introduce the child to artistic things; it should form his taste through contact with the masterpieces of ancient and modern times; and all education, whether in the school or in the family, should reveal an intellectual and moral unity such as that outlined by M. Thomas in his book on *Education dans la famille.*

(2) *The Relation of Psychology and Education.* — The greater part of the above-mentioned collections or bulletins frequently refer to investigations of these subjects. Among the monographs that have appeared during the last few years, the following are deserving of mention: Dr. Chaumet, *La croissance des enfants à Paris;* Dr. Javal, *Psychologie de la lecture et de l'écriture;* Dr. Claparède, *Psychologie de l'enfant et pédagogie expérimentale;* A. Maire, *Technique du livre;* G. Demeny, *Mécanisme et éducation des mouvements;* Irving Hancock, *L'éducation physique au Japon* (Ferrus and

Pesseaud, tr.); Dr. Joland, *L'hygiène oculaire à l'école;* Compayré, *Psychologie de l'adolescence;* J. de Walleus, *La science gymnastique;* Widsemski, *Essai d'anthropologie pédagogique;* Dr. de Fleury, *Nos enfants au collège;* Dr. J. Philippe, *Psychologie des écoliers;* R. Mercier, *Conférences d'hygiène et de puériculture.*

The outcome of all these investigations is that the old pedagogy, based upon personal impressions of doubtful accuracy, though more or less helped out by practical experience and a knowledge of the temperament of the child, is now seeking its support in more accurate and more scientific data. In order to justify its processes of teaching and its means of discipline, it is striving to find certain objective indications analogous to those known to the medical men as 'symptoms.' Thus it follows that the majority of those experts whose advice is sought for improving the ordinary teaching processes belong either to the medical profession or to the psycho-physiologists whose vocational training has accustomed them to seek the objective side of our mental states.

The new pedagogy, then, has first sought to discover the means of directing the physical growth of school children. France is paying much attention to improving the hygienic conditions, to the questions of proper food and school furniture; in a word, to everything that affects the bodily development of the pupil. Children's diseases in the school, and the means of preventing them, or at least of minimizing their physiological and psychical consequences, are the objects of special consideration. The teachers are likewise taking a much greater interest than heretofore in the comparative value of the methods of physical education. The controversy among the various schools of physical training has become keen. Three systems are in vogue: the antiquated system of Amoros, which gradually became a method of mere feats of strength; the old Swedish system of Ling, which possesses some good points, but at the same time persists in retaining certain movements that have been condemned by physiology and medicine alike; and finally the eclectic system, which, throwing aside tradition and recognizing no authority other than that of science itself, declares that it is ready to borrow the best from every system. This eclectic system is gaining ground daily.

Parallel with the physiological development, contemporary pedagogy is studying the intellectual development of the pupil. If one wishes to guide the mental growth of the child more accurately and more confidently than heretofore, is it not important to understand how the various faculties develop, and through what stages, for exam-

ple, the memory, the imagination, the ability to think in abstract terms, pass in the process of their refinement ? Teachers, especially those in the primary school system, have begun of late to lay hold upon these ideas and to apply them in their work. This new information has been widely disseminated, so that there is no doubt that intelligent teachers have realized considerable progress.

(3) The facts about abnormal pupils found no place in the old treatises on pedagogy; only physicians concerned themselves with such children; even they studied only those who seemed sufficiently ill to have need of constant care. Now numerous articles are appearing every year on the education, the medical examination, and the medico-pedagogical treatment of such children. Among the most important of these may be mentioned the publications of Dr. Bourneville, *Le traitement médico-pédagogique de l'idiotie*, and *Les enfants anormaux au point de vue intellectuel et moral;* the new edition of Séguin's *Le traitement moral et l'éducation des idiots et des arriérés;* G. Rouma, *Les troubles de la parole chez les écoliers;* Dr. J. Philippe and Dr. G. Paul-Boncour, *Les anomalies mentales chez les écoliers;* Dr. Coutet, *La régénération des familles et des races tarées;* L. Proal, *Le suicide chez les enfants;* Colliard, *L'éducation protectrice en Prusse;* Dr. Cruchet, *Les arriérés scolaires;* Dr. Chazal, *Les anormaux psychiques.*

Running through all these publications one notes the constant effort to reconstruct the nature and the intelligence of these backward and abnormal children by first curing them of their physical ills. With rare exceptions, all teachers are to-day inclined to give physicians the principal rôle in this medico-pedagogical treatment, especially at the outset. It is furthermore absolutely essential, as is pointed out in *Les anomalies mentales chez les écoliers*, to adapt the pedagogical processes to the mentality of each child, instead of attempting to bend his mind in accordance with school programs and processes. It is necessary, therefore, to individualize his education.

For a more general discussion of the trend of thought in the various fields that have just been touched upon, the reader is referred to the *Revue Philosophique* for 1906 and 1907, M. Blum, *Le mouvement pédologique et pédagogique en 1906*, and Dr. M. Bernard-Leroy, *La psychologie infantile en 1907;* also in the *Revue Pédagogique*, 1906 and 1907, M. Chabot, *Les revues des livres de pédagogie.*

In conclusion, it is worth while to note the two great tendencies followed at the present time in France by those who devote themselves to investigation along the line of scientific pedagogy. All aim to do

scientific work, but all do not follow the same method. On the one hand, some believe that the documents necessary for such scientific work may be collected by wholesale investigations, by means of questionnaires, by experiments carried on *en bloc* on a whole class at a time — the method that has been followed for several years by Stanley Hall. Others, on the contrary, do not believe that these investigations lead to any positive generalizations, to any fixed pedagogical laws, unless there have first been collected a very large number of observations made directly upon children studied separately and as individuals. In other words, it is by the individual monograph method and not the questionnaire method that they hope to discover the laws of the growth of the child, of the development of his faculties, and the means the school can employ to direct or correct this development. Up to the present time, this second group of investigators has contributed most to the success of these researches.

JEAN PHILIPPE.

THE SORBONNE.

III. IN ENGLAND.

For some reason, England has always been singularly unwilling to apply inductive and quantitative methods to the study of psychological processes. This is probably because in an old country, strongly organized on lines of special privilege for classes, any inquiry into the fundamental reasons for action is sure to disturb vested interests on every side. As a consequence of this attitude of mind, experimental psychology and sociology have never had a cordial reception in the English universities, nor among the people in general. Since the disastrous experiences of the South African War, however, the leaders of English thought have realized that the British Empire can no longer be trusted to 'muddle through' the difficult problems of modern civilization, and various methods have been set on foot to estimate the national efficiency and to provide for national defects. These investigations have taken a form quite different from similar studies in the United States.

In this attempt to understand herself, England has depended mainly upon royal commissions of inquiry and international congresses. The most important of these commissions was appointed in 1904, and was called the Inter-Departmental Committee on Physical Deterioration. The committee recommends a thorough reorganization of the various agencies and societies at present working for improved conditions, and lays especial emphasis upon the necessity for

a comprehensive census of the English people along the lines of physical development. It feels that this could be begun by examining and recording measurements of the children in the state schools, and of candidates for the army and for civil service appointments. This report stirred the British mind to its foundations, and another royal commission was appointed to work over the whole problem of providing for dependent classes. This commission has been working for nearly four years, and its report is not yet ready.

Another royal commission was appointed to consider and report on 'the existing methods of dealing with idiots and epileptics, and with imbecile, feeble-minded, or defective persons not certified under the lunacy laws.' This commission sent an important committee to study conditions in the United States, and it has just brought in an elaborate report in eight volumes which includes an enormous quantity of new material which is yet to be summarized.

During the past year three extremely important international congresses have been held in London. The first of these met from August 5 to August 10, 1907, and dealt with School Hygiene. Several quantitative studies were brought before the sections, and an important volume of proceedings has been published by the Sanitary Institute.

The second congress dealt with the Advancement of Drawing and Art Teaching, and papers were presented by distinguished men and women from all parts of the world. It has also published an important volume of proceedings. In connection with this congress the American representatives prepared a handsome volume of papers called *Art Education in the Public Schools of the United States.* This volume was edited by Dr. J. P. Haney, of New York, and contains an extended chapter on child study in connection with drawing.

The third international congress was probably more important than either of the others. It was called the First International Moral Education Congress, and held its sessions from September 25 to 29, 1908. Four hundred foreign delegates came together, and the papers represented every possible aspect of moral education. The volumes of proceedings represent the most important contribution so far made in this difficult field of education. Closely allied to the work of this congress is the work of an organization established in London about three years ago for the investigation of the whole problem of moral education. This organization was international in its scope, and the results of its studies and investigations in all parts of the world have recently been issued in two volumes edited by Michael E. Sadler.

As a result of the work in child study presented in the Inter-

national Educational Congress in Chicago in 1893, the British Child Study Association was formed. It developed branches in the principal centers of the British Islands and directed its work especially to investigating the practical needs of the school and the home. It published a journal called *The Paidologist*, which went through nine volumes. There was also in London at the same time a society, largely composed of physicians, called the Childhood Society, and while its aims were more directly scientific, the work of the two societies was essentially the same. At the close of 1907 the two societies were amalgamated under the name of the Child Study Society. It planned a new journal to be called *Child Study*, the Journal of the Child Study Society, to be published four times annually. The meetings of the new society have been well attended, and some of the papers have been the result of careful investigation in new fields. Notable among these is the paper by Miss Alice Ravenhill on the 'Sleep of School Children,' which was based on a careful study of more than six thousand cases.

In England, as in America, much of the best work that has been done in the study of children during the last few years has appeared in connection with the reports of the medical inspection of schools. In England the reports of Dr. James Kerr, Medical Officer for London, which appear each year, are filled with a wealth of information concerning the physical development of children, and many of his investigations throw strong light on mental development.

On the whole, public interest in psychological questions in England is steadily growing; but it is a practical interest, forced home on the people by a disorganized school system, by industrial stagnation and an army of unemployed people, by the agitation for woman's suffrage, and by the unrest in India. While social, political, industrial and educational questions are so pressing it is difficult for able leaders to settle down to the study of the elementary facts of mental and social life.

EARL BARNES.

PHILADELPHIA.

IV. IN ITALIAN, SPANISH, ETC.

ITALIAN.

The six numbers of the fourth volume (1908) of the *Rivista di Psicologia Applicata* (Bologna) edited by G. Cesare Ferrari contain several articles of interest here. A. Pellottieri's 'L'instinto di appropriazione e le idee sulla proprietà nei bambini' (pp. 31–52) is based

partly on observation of his own child. In the first years of life, the child 'recognizes its own identity by seeing itself surrounded by a not very variable complex of things with which it finds itself always in the same relations.' In this semi-consciousness interest fuses with appropriation. First and foremost is the appropriation of food and the suggestion of the 'sense of eating,' then those of the other senses. Children love full and complete possession of their things. Construction and destruction of play things are assertions of ownership, conditioning of which by parental tutelage is a great source of grief. More interesting than the possession of toys or of money (later on) is the possession of the child by itself (its self-plays) and its possession of parents and others. The love of acquisition and the jurisprudence of childhood deserve special treatment, and many parallels with the history of the race suggest themselves as the idea of the property of others dawns in the child's mind.

In another article, 'Il bisogno di possedere e la personalità' (pp. 517–529), the same author discusses ownership in relation to personality, pointing out the value of economic independence in developing the true sense of self. The ideal social formula should be to assure to every one the means of freely exploiting his own individual and social activity for the benefit of himself and his fellows.

G. Pennazza's note on 'La scrittura-disegno e il disegno-scrittura (pp. 86–89) discusses briefly the attempt by an analphabetic idiot boy to copy a sentence written on a slate. When the slate was turned over in order to continue the writing on the other side, the boy stopped copying the words and drew pictures to illustrate the story as he had heard or imagined it. Evidently it is possible for feeble-minded children even to learn to read and write (*i. e.*, draw) to a certain extent without knowing the letters of the alphabet, syllabification, etc. This 'writing-drawing' (and 'drawing-writing') lies close to some of the phenomena of expression found among primitive peoples. G. Pennazza is also author of *Piccolo mondo primitivo* (Bologna, 1909), treating of defectives.

Professor U. Loreta, in his 'Aparecchi di psicologia pedagogica' (pp. 171–174), describes a new apparatus for demonstrating practically to children the formation of compound colors; also an improved apparatus for testing tactile sensibility. In his article on 'Principi vecchi e applicazioni nuove' (pp. 305–319) U. Pizzoli describes and figures new devices and instruments for psycho-physical research: A method for educating the color-sense in children; a 'double ergokinesiograph,' for the measurement of voluntary attention; a 'miokinesio-

scope,' for the study of voluntary movements of the arm in connection with writing, etc.; a new innocuous algesimeter; also a cabinet of psycho-physical apparatus (spirometrograph, miokinesioscope, esthesioscope, dinametrograph, algesimeter, double synkinesiometrograph, chronometer), so arranged that one mechanical movement and one source of electric energy can be used to keep them going. Another piece of psycho-physical apparatus, the 'bitemporal sphygmometric angiograph,' is described by Professor M. Patrizi, in his article 'Un angiografo bitemporale con annesso sfigmometro' (pp. 204–210).

Ida Faggiani's note, 'Intorno alla natura della bugia infantile' (pp. 262–266), treats of auto-suggestion and collective suggestion in relation to children's lies. The child who has begun to lie, knowing that he is lying, ends by being convinced that he has spoken the truth. With the child the power of inhibition has not kept pace with the power of observation and the ability to associate and combine in the mind the most improbable things. It can and does often lie even when the facts are plain. In Dr. A. Morselli's 'La mensogna nell' esterica come indice d'infantilismo psichico' (pp. 401–436) the author, after giving details of the cases of five female hystericals, discusses lying in hysteric persons as an index of psychic infantilism. He points out a 'real resemblance' in the genesis and the course of hysterical and infantile simulation. Lying and simulation have behind them an ancestry of defence.

In his 'Note antropologiche e psicologiche in rapporto alla intelligenza e al contegno dell' alunno in classe' (pp. 71–85) G. Gianolio, of the Institute of Legal Medicine of the University of Rome, gives results of anthropological and psychological examination of 54 boys (normal 18, unruly 18, backward 18) between the ages of 8 and 13 and of homogeneous social condition, from the elementary schools of Rome. The normals were found to have 1.33 anomalies of head and face per individual, the unruly 4.83, the backward 6.27. As to touch, the normals and the unruly differed little, the backward being much below both; in general sensitiveness the unruly and backward were close together and much inferior to the normals; in sensitiveness to pain the superiority of the normals over the others is again marked. In affectivity and morality the difference between the normals and the unruly is great, but the differences in intelligence are not marked.

C. Piccinini, in a brief essay, 'Sul valore degli errori cromatici nell' infanzia' (*Archivio per l'Antropologia*, Vol. XXXVII., pp. 41–45), gives the results of the investigation of color-errors in 80 children, finding that, contrary to the conclusions of Garbini, mistakes of

this sort in children of 6 and 7 years are due in large part to lack of attention, and do not therefore demonstrate any principle.

In the *Atti della Società Romana di Antropologia* (vols. 13–14, 1907–1908) has appeared the following: R. Livi's 'Sulla causa del destrismo e del mancinismo' (vol. 14, pp. 91–94), in which he concludes that the fundamental cause of the predisposition to righthandedness and lefthandedness is 'uterine position,' this predisposition may, however, be counterbalanced by various minor causes, so that one born righthanded may become lefthanded and *vice versa*.

In the first four numbers (vol. II., 1908–1909) of the *Rivista Pedagogica* (Rome), the organ of the National Association for Pedagogical Studies, edited by Professor Luigi Credaro, of the University of Rome, are a number of valuable articles. In his 'Pel concetto di Pedagogia' (pp. 1–15) Professor N. Fornelli, of the University of Naples, finds the object of pedagogy in 'the educable man, or man in evolution, in full, in complete, in total evolution,' evolving, growing man; development, growth, improvement from the child to the adult. This is the field also of other sciences. But pedagogy differs from them in its essentially *practical* character. In some respects this practicality resembles that of medicine, in others that of the political sciences, *e. g.*, in its power and capacity to modify, to vary and to adapt itself to the circumstances of the time, place and person. Q. Tonini, of the Male Normal School in Pisa, treats in his article on 'I Discoli' (pp. 16–37, 189–211) of idiocy, juvenile crime, classification of defectives and abnormals, reformatories, the place of the school in the education of abnormals, etc. The author believes that various kinds of auxiliary and subsidiary classes and institutions ought to arise for the benefit of defectives and abnormal children. And the normal school ought to be broadened and deepened until it becomes a 'universal pedagogical clinic,' as Fiebig maintains, where may be studied concretely all or almost all the phenomena of normality and abnormality.

In 'I metodi di Cohn per la rapida determinazione in massa della acutezza visiva e del senso dei colori negli scolari' (pp. 79–87) Dr. A. Graziani gives the results of experiments on visual acuity and color-vision carried out in 1907–1908 upon 1,460 pupils in the elementary schools of Padua. About 5 per cent. of all children examined were affected by dischromatopsia, the colors most frequently confused being red with green and blue with violet. The average visual acuity for boys was $14.50 \div 6$, for girls $15.20 \div 6$, or about double that fixed by Cohn as the normal limit value; the percentages

of myopia were for boys 10.4 per cent., girls 14.2 per cent. The lower grades in the schools show a smaller visual acuity than the higher, but this inferiority is probably due to difficulties incurred by the smaller children in the *modi operandi*. Myopia increases from the lower classes to the higher. In grade IV. the Cohn method gave a percentage of 11 per cent. of myopia for boys and 16 for girls; tests by another method carried out some time previously by Dr. Grazia gave 14 per cent. and 20 per cent. respectively, about the same relative proportion.

In a brief article, 'La scuola mista è veramente dannosa?' (pp. 212–217), Signora Laura Ciulli-Paratore, of the Normal School in Chieti, approves of co-education from having 'experimentally confirmed its didactic and moral advantages, which far outweigh the petty inconveniences and difficulties it presents.' Under the title 'Problemi di pedagogia sessuale' (pp. 398–399) Professor Pio Foa discusses the question of education in matters of sex, holding that such education ought to begin 'when the child asks its mother where babies come from.' The facts of the vegetable and animal worlds should be used in the schools as far as possible to teach the truth about sex-phenomena, when such instruction can be safely carried on.

Among Italian books and pamphlets belonging more or less within the sphere of education and child-study the following may be briefly mentioned: A. Marchesini's *La parola nella vita e nella scuola* (1909), in which are emphasized the individual and social rôle of language and its importance as the prime pedagogical tool; Dr. T. M. Elvira's *Il bisegno nella educazione* (Pavia, 1908), which deals with drawing as one of the notable means of individual expression and its place in the curriculum; G. Cesca's well-written *Religiosità e pedagogia moderna* (Messina, 1909), which T. Armani thinks will be the 'best work of the year in general pedagogy.' The new liberal pedagogy is 'the direct product of ethical religiosity which compels recognition of and respect for the rights of free and autonomous individuality'; the prime foundation of education lies in religion, but liberal religion, not servile theology. The new pedagogy is not aristocratic, seeking to mechanize the people, but liberal, having in view the awaking of the altruistic feelings and the formation of the man. It substitutes the cult of duty for that of pleasure, and recognizes as absolutely necessary personal autonomy and the rights of reason.

These works also may be cited here: C. Gavazzi's *L'arte nell' educazione popolare* (Firenze, 1908); E. Altavilla's *I fattori della delinquenza colposa* (Napoli, 1907); P. Vecchia's *La funzione sociale della scuola* (Lanciano, 1908).

SPANISH.

In the *Archivos de Pedagogia y ciencias afines* (Vol. IV., Nos. 10–12, March–Sept., 1908), the organ of the Pedagogical Section of the Faculty of Juridical and Social Sciences of the National University of La Plata, appear several articles deserving notice. Valeriana Astelarra's 'La visión' (pp. 19–58) gives the results of experiments on the eye-sight of 20 pupils (female) in the Normal School of La Plata. To this article are appended (pp. 49–58) the figures of the dynamometric tests (right and left hands) of 22 pupils in the Colegio Nacional de Señoritas, La Plata, with statement of day and hour of experiment, barometric pressure, temperature, force of wind, etc. In an article on 'Estesiometria tactil' (pp. 59–68) Paulina Stigliano publishes the record of esthesiometrical experiments (forearm, palm and back of hand, forehead, tips of fingers, left hand first and then right) on 22 pupils (female) of the Liceo de Señoritas, La Plata. The order of acuity of touch-sensation is finger-tips, palm, back of hand, forehead, forearm. Tactile acuity seems to be greater from left to right and from below up. The fingers of the left hand seem more sensitive than those of the right. In her article on 'La audición' (pp. 204–226) Isabel J. Chamans gives the results of experiments made (keenness of hearing, sensitiveness for harmony, tone, etc.) on 23 pupils (girls of 15 years) in the same Liceo, — four tests being held. No cases of obtusity or serious anomalies were met with. Evangelina Ayarragaray's article on 'La visión' (pp. 227–252) gives details of the examination of the visual acuity, color-sense and sensitiveness to light of 20 pupils (girls) of 15 years of age in the same institution. The positiveness of sensation for the left eye is greater than for the right, — this may be due to the fact that the right eye being used more has lost some of its power through excessive work. The order of positiveness with respect to the colors is red, yellow, blue, green. The colors most confused are blue with green and yellow, yellow with green, orange and rose, green with blue, yellow and violet. In general the eye appreciates more the qualities than the intensities of luminous sensations.

The article, 'Musculos. Fuerza muscular. Dinamometría' (pp. 253–270) by Celia G. Bergez gives the results of dynometrical experiments (right and left hands) on 22 pupils (girls). Strong emotions seem to diminish the strength of pressure (notably in one case). Stature and weight appear to exert some influence, the highest muscular energy corresponding to the greatest height and weight. The pupils concerned were the same as in the experiments of Miss

Astelarra. The figures for height and weight of 19 of the subjects are given. The article of Professor Martín Navarro, 'La Paidologia,' (pp. 236–353) gives a general sketch of the history of child-study.

R. Senet's article on 'El niño de esta época' (pp. 386–399) discusses the physical and mental precocity of Argentinian children of today, the effect of the predominance of women as teachers and related topics. He seems to believe that 'women cannot educate men,' — she who does not possess a male *psyche* cannot form one. In 1882 the teachers of the Province of Buenos Aires were 48 per cent. men and 52 per cent. women; in 1907 the figures were 18 per cent. and 82 per cent. The *belicoso* period in man has not disappeared by reason of this great preponderance of female instruction; it only appears later.

In *El Monitor de la Educación Común* (Vol. 28, 2d S., No. 47) Professor V. Mercante publishes an article on 'La audición coloreada,' in which, after a general discussion, he gives the results of his investigations on 344 girls and 362 boys between the ages of 9 and 22 years. Among the conclusions reached are these: Colored hearing is a relatively common phenomenon, being neither exceptional nor pathological. Words and sounds evoke colors more easily in girls, but generally the same dominant color in both sexes. The verbochromatic gradations according to age are more apparent in the abstract or meaningless terms than in the vowels and concrete terms.

Dr. J. Lahille's brief monograph (41 pp.) on *Signos físicos y medición de la inteligencia* (Buenos Aires, 1908) criticizes the attempt to establish relationship between physical measurements of the skull and mental aptitudes. To be sure, there exists some slight correlation between the dimensions of the head and intelligence, but it is quite another thing to deduce the *psyche* of an individual from his cephalic dimensions.

A notable feature of the year is the appearance of *El alma del Niño* (Madrid, 1908), the first translation into Spanish of Preyer's classic work, *Die Seele des Kindes*.

Dutch.

The first part (pp. 1–90) of the sixth year (1906–7) of the *Paedologisch Jaarboek* of Dr. M. C. Schuyten is entirely devoted to the editor's monograph 'Onderzoekingen over Esthesiometrische Variatie bij Kinderen gedurende het schooljaar.' The second part contains 'Over Geheugeenvariatie bij Schoolkinderen' (pp. 91–128), 'De Oppervlakte van het Geschrift' (pp. 129–158), and 'Over Vóor- en Namiddagonderwijs' (pp. 159–207) all by Dr. Schuyten. He is

also the author of the contents of the first part of the seventh year. Of nearly all these studies, treating of esthesiometrical variations in children during the school year, variation in memory, morning and afternoon instruction, consumption of bread and the annual curve of vital energy, right and left leggedness, etc., the author himself furnishes good abstracts in French making it unnecessary to do more than refer to them here.

Hungarian.

An interesting product of child-study activity in Hungary is L. Nagy's *A gyermek erdeklödésének lélektana* (Budapest, 1908, pp. 172), 'The Psychology of the Child's Interest.' Its five chapters treat of the theory of interest, the development of interest, the motives of interest, the interest of the child and instruction, the individuality of the child and interest. Of American writers and contributors to the literature of child study the author cites Burk, Croswell, Earl Barnes, Miss Shinn, Baldwin, *et al.*

A. F. Chamberlain.

Clark University.

PSYCHOLOGICAL LITERATURE.

CHILD PSYCHOLOGY.

Mind in the Making. Edgar James Swift. New York, Charles Scribner's Sons, pp. 329.

While Professor Swift's *Mind in the Making* like most other genetic treatises tends at times to underestimate the value and the potency of non-subjective factors in the educational process, it on the whole constitutes one of the most stimulating books on education recently published. The first chapter demonstrates from the apparent dullness of many celebrities during school life that failure to master the conventional educational content in the customary way can never indicate more than the absence of 'a certain specialized ability' and may occasionally indicate the presence of exceptional possibilities. "Childhood is the period of racial inheritance. For this reason every young child must be regarded as a possible genius. The function of the educator then, while elaborating to the fullest extent the basal racial characteristics, is to enter so completely into the lives in his charge that he may discover each new variation at its emergence" (p. 32). Here and in the final chapter on the 'Reconstruction of Nature' the mutation theory of DeVries is given, so far as I know, for the first time, its educational application in formal treatise.

Tendencies commonly called criminal, being also racial, are common to the whole mass of children. Every young child is therefore not only a possible genius but a possible criminal. "The remedy is not so much Froebel's substitution of one process for another, as it is the substitution of a new purpose for the old one in the same process. It is the recognition of the right of race instincts to exist" (p. 93). For this, as for the discovery of variations and the recognition and amelioration of the nervous irritants and physical defects, impressively exemplified in chapters III. to V., the expert education of the mass of teachers becomes necessary (pp. 32, 143, 168). If teachers are to become thus expert, 'the effective scientific method must replace the expensive method of following unorganized experience.' While the experiments and investigations cited in chapters VI. and VIII. are highly suggestive, I cannot but believe that it is the fragmentary and unsystematic nature of such educational research rather than the 'School-

mastering Education,' described in chapter IX., that is responsible for the delay in educational reform. It is not a too exacting supervision, but a non-expert supervision; not the feeling on the part of teachers that inherited schoolroom methods (p. 299) are 'a part of themselves' (p. 294), but the absence of methods universally valid that prevents them from performing a function that must be in part, it is true, individualistic, but on that account none the less dependent upon methods effective with the mass of pupils.

Against the scientific determination of such methods, the extreme of individualism, which insists upon each teacher's following the plan of work best suited to her personality and teaching each child in a different fashion, has been by no means the least formidable obstacle.

A. Duncan Yocum.

University of Pennsylvania.

The Child's Mind; Its Growth and Education. W. E. Urwick. London, Edward Arnold; New York, Longmans, Green & Co., 1907. Pp. xi + 269.

Most English books on the theory of education and mental development have been written from the view-point of philosophy, or formal logic, or Herbartian or Froebelian psychology. But the book before us abandons almost entirely the philosophical attitude and method, and attacks the subject in the spirit of contemporary science. It is apparent that the author is in sympathy with the conceptions of human nature suggested by the general principles of evolution; and he is familiar with the theory of mental function given us by present-day biological psychology. His point of view, and most of his conclusions, are quite in harmony with the prevailing tendencies among educationists on this side of the Atlantic. American educators are coming more and more largely to place their hopes for a workable theory of educational aims, values, and processes in the adoption of the methods of the naturalist in treating education. They have become profoundly distrustful of the philosophical and logical methods in discussing problems of either educational theory or practice; and Mr. Urwick seems also to have lost faith in these methods.

The general character of the book may be inferred from the fact that it conceives of education as the process of equipping the individual with means so that he may the more effectively adjust himself to his environments. Subjects of study and methods of teaching are evaluated in view of their service in aiding the pupil to attain the supreme end of life — adaptation. The child is taken from the beginning, and

it is shown how he learns to adapt himself; what mental processes make their appearance as the sphere of adjustment enlarges, and what is the *raison d'être* of any process. Mind is conceived of as the instrument for attaining adjustment, and not as an independent entity, to be analyzed and described as though it were composed of parts or organs that had meaning aside from their function in securing adaptation. The book is thus a plain, simple, and rather general statement of some of the principles of mental development, and of education viewed from the modern standpoint. It is not suited to advance educational theory so much as to popularize what is now generally accepted by contemporary educationists of the evolutionary persuasion. It should be added that to some extent it lacks *concreteness* and *vividness;* it impresses the reviewer as having been written by one who aimed at system and logical consistency in his treatment rather than a direct, first-hand description of child-life as it is displayed in the ordinary situations of daily life.

M. V. O'S.

Notes on the Development of a Child. The Development of the Senses in the First Three Years of Childhood, Vol. II., 1908. University of California Publications in Education, Vol. 4. Milicent Washburn Shinn. Berkeley, University Press. Pp. 258.

With respect to the sources of the data reported in Volume II. of the *Notes*, and the method of obtaining them, the author writes: "My original data for the following study have come almost entirely from a journal of the development of a single child (the author's niece). . . . But in the later examination of the data I have supplemented them with the observations of others. My record was but little guided by any previously formulated theory, or by the effort to solve any previously formulated problem. . . . In the main, I aimed only at a scrupulously objective record of the facts of development, as they appeared quite spontaneously."

The data thus collected were classified and published as Volume I. of the *Notes* which may be described as a rich store-house of accurate, minute observations relating to the sensory and motor development during the period of infancy.

The purpose of Volume II. is to summarize and interpret the previously published observations relating to the development of the senses. By 'interpretation' the author means tracing 'the development of the senses from stage to stage, with reference to the genetic relationship of these stages, and the process by which each unfolds from the pre-

ceding,' the search for the general law of this unfolding, the consideration of 'the bearing of any results thus reached on current problems of psychology,' and finally, the author formulates, as corollaries, the pedagogical suggestions of the study.

Of the two methods which have been employed in the study of infancy — the comparative and the biographical — Dr. Shinn regards the latter 'thoroughly checked and corrected by comparison' as the true one for the study of children of the earliest period.

Concerning the difficulty of finding a satisfactory principle of classification for the data of child development the author writes: "The analytic headings dismember every incident we would report, for the actual development we are tracing is essentially synthetic, yet we must analyze, in order to interpret." All in all, a modification of the Spencerian formula for the process of evolution supplies a satisfactory guiding principle — viz., child development is 'a progressive movement consisting of the integration of simpler activities into more complex, and the differentiation of specialized ones, out of generalized.'

The principal conclusions of Part I., Vol. II. (Sensibility of the Newborn) are: "The child is, at birth, capable of receiving impressions in every department of sense (unless for a short delay in the case of hearing). . . . These sensations of the newborn are very limited and feeble, and seem to be simple and detached experiences, . . . are justly to be regarded as *pure* sensations in which there is no consciousness of space, of externality or internality, of surrounding objects, or of self" (pp. 12, 47).

Part II., The Synthesis of Sense-Experience (the visual-motor association series, the tactile-motor association series, synthesis of the visual-motor and tactile-motor association series, auditory associations, associations of the minor special senses, feeling of a bodily self). The author's principle of classification is used with great effectiveness in this part in organizing and interpreting the wealth of detailed observations which she had previously reported.

Part III. traces the development in Discrimination and Interpretation in the different sense departments — sight, hearing, touch, etc. The treatment of sight, particularly the section on 'color-vision,' is worthy of special mention.

Two general conclusions of the work may be noted: (1) The development of the senses does not follow the phylogenetic parallel — though some specific phases of the development show such correspondence, (2) the psychic life of the child centers from the first about the higher senses, especially sight, not the lower.

OHIO STATE UNIVERSITY. DAVID R. MAJOR.

The Boy Problem. WILLIAM FORBUSH. Boston, Pilgrim Press, 1907. Pp. 219.

This book in its original form passed through five editions; the sixth edition is rewritten and considerably enlarged. A few years ago a book of this title would not attract much attention outside of educational circles; but we have entered an era when the boy problem is of interest not only to parents and teachers, but to the public as well. Mr. Forbush is prepared to write on this subject, for he has studied it probably as carefully as any one, alike in its theoretical and in its practical aspects. As a result, his book impresses one as being sound, sensible, and wholesome. Unfortunately most writers on this topic allow their feelings to dominate their judgment; and they do not follow effective methods in determining what a boy's dominant impulses are at different stages in his development. One could sum up all such persons say in the general exhortation, "Let us love our boys, make them happy, and do them good." Now this is doubtless of some service in the practical training of boys, but yet it does not put us forward in education very far or very rapidly, since our chief difficulty lies in the fact that we do not know in much detail what is good for boys, and we seem quite unable often to make them contented with our programs. We strive, with the best of motives, to make them happy along the lines of our own feelings; but somehow the boys do not respond to our advances as they ought.

The chief virtue of the book before us is that the author has something of the attitude of the naturalist in dealing with boys. He is familiar with contemporary biological and psychological theory, and this has been of service to him in observing and interpreting the tendencies of boys under varying conditions in daily life. His method of handling them is based on the conception that they are more or less primitive in their interests, that they love adventure and daring, that they must be active, that they tend to form gangs and prey upon society; but yet with all this they have tendencies which, if recognized in their training and effectively appealed to, will in time bring them into harmony with the customs and institutions of civilized society.

Mr. Forbush lays out a thoroughly dynamic régime for the treatment of boys, which, in the opinion of the present writer, is our chief need in contemporary American society. He shows how we ought to organize and conduct the school, the church, and the home so as to reach boys on the plane of their crude masculine impulses. He condemns the typical Sunday-school and similar agencies for helping boys because they are too largely in charge of good-hearted, but entirely

incompetent persons. This book should give the reader a better understanding of boy nature, and should suggest to him practical means of controlling and guiding that nature in the most effective way, and with the coöperation of the boy himself.

The Training of the Human Plant. LUTHER BURBANK. New York, The Century Co., 1907.

Achievements in the development of new species of flowers, grains, fruit and the like impress most people as bordering on the miraculous. Until recently Mr. Burbank's attention has been devoted wholly to plants, but now we have from his pen this book of one hundred pages presenting his views on the training of the child. He has manifested such extraordinary power in the modification and training of plant life that one cannot fail to be interested in his views on the education of children.

First he discusses the mingling of races in our own country, and he reaches the conclusion that we may produce a stronger race than has yet appeared in the history of the world. But when the crossing of strains has been accomplished the most is yet to be done. Beyond this is the care, the nurture of the young. Animal life is influenced by all that environs it, and especially is this true of the child. Everything impresses him, and what most frequently acts upon him 'becomes constitutional and ingrained.' The author is in a way in sympathy with Rousseau in that he would not let a boy or girl see the inside of a schoolhouse before ten years of age. The country is the only place in which to rear a child. Of course, if children must live in the city, the school may prove the lesser of two evils.

In cultivating his plants, the author says he must work with infinite patience; but in the end he accomplishes his aim. A child must be reared by those who love him. "A man who hates plants, or is neglectful of them, or who has other interests beyond them, could no more be a successful plant cultivator than he could turn back the tides of the ocean with his finger tips. The thing is utterly impossible." This sounds like Froebel, Pestalozzi, Dickens, or Parker.

Perhaps one of the most interesting chapters of this book is entitled 'Be Honest with the Child.' The author has found that he must be absolutely truthful with nature in rearing his plants, so he thinks that one who is dishonest with a child, whether his own or someone else's, blasts that child's life. We must teach the child self-respect, too, and we must everlastingly repeat the good impressions which we make upon him so that they may become fixed in his very

nature. We must keep fear out of his life, whether religious or otherwise. We must put courage before children, and they will absorb it as the 'plant absorbs the sunshine and the dew.'

The chapters which are devoted to a discussion of the physical needs of the child — sunshine, good air, and nourishing food — are as sane and as practical for the teacher as for the parent. The same may be said of the chapters on growth, environment, heredity and the like.

Introduction to Child Study. W. B. DRUMMOND. London, Arnold; New York, Longmans, Green & Co., 1907. Pp. 348.

In this book Dr. Drummond has summarized the work that has been done up to date in the study of the child in respect to his physical, intellectual, moral, and religious development. It is designed particularly for teachers and parents in England, where child psychology has not progressed as far as it has with us. This accounts for the space which the author has given to a discussion of cautions to be observed in child study, and practicable methods of conducting the work. When the subject was new with us considerable attention was given to these topics; but in this country we have grown to the point where we have ceased discussing formal questions of methods of work, and are devoting our energies to the solution of definite problems concerning child nature and the methods of treating it. Dr. Drummond's summary will be helpful to teachers who are unfamiliar with what has been done; but for those who have kept in touch with the work in this country nothing at all new will be found in this book.

M. V. O'S.

MENTAL DEVELOPMENT AND EDUCATION.

Growth and Education. JOHN MASON TYLER. Houghton, Mifflin & Co., 1907. Pp. 294.

To those who are used to looking upon education as a process of book study this volume will be either a shock or a revelation. Instead of discussing what the child is to learn and how he is to learn it as does the ordinary work on education the book treats as of paramount importance the amount and kind of growth that is taking place at each stage of development. Instead of treating of intellectual and practical needs of children and the logical relations of subjects of study, the author directs his attention to the physiological processes of growth, manifesting the utmost faith in nature's methods however indirect and illogical they may be.

After discussing the present needs of education and considering

man in the light of evolution he refers to the hints given by embryology, then discusses the growth of the body as a whole and its different parts. Following this are applications of the principles discovered to mortality, morbidity, and to the various periods of development before and after entering school, with special discussions of physical and manual training. A final chapter summarizes conclusions, and is followed by an appendix containing tables of growth, and rather an extensive bibliography.

The style of the book is popular, picturesque and forceful, as everyone would expect who has heard the author lecture. As an expression of a sensible man's opinions on educational questions as viewed from the standpoint of a biologist, the book must be regarded as a very important contribution to educational literature. Its wide circulation will serve to counteract the pernicious influence of much old-time theory and practice. If, however, the book were supposed to embody the facts and principles of education as determined by the facts and principles of growth and development it would be very unsatisfactory and misleading. The author has evidently made himself acquainted with about all the facts of growth that have been scientifically determined, and he has probably done all that anyone could do in the way of interpreting those facts and indicating their applications to education; but anyone who looks at the matter from a strictly scientific point of view will at once realize that it is utterly impossible to arrange a course of study or determine the methods of teaching from the facts of growth that are now known. A word of caution to the reader is perhaps needed lest he accept Professor Tyler's personal opinions regarding education, as truths already scientifically established by the facts of growth.

E. A. KIRKPATRICK.

STATE NORMAL SCHOOL,
FITCHBURG, MASS.

Social Education. COLIN A. SCOTT. Boston, Ginn and Company, 1908. Pp. v + 300.

This work very modestly claims for itself only the presentation of 'a point of view or method of thinking rather than a completed system of thought.' It comprises records and discussions of experiences with school children, but does not attempt a scientific proof of any theory. When the reader has finished the volume, however, he will find the 'social' point of view to be pretty thoroughly established in the conviction of the author as the only way open for escape from the serious

and radical defects of the school operating under the historically consecrated methods or points of view. The book is timely; and inasmuch as it shows what is possible in school exercises, it goes far in offering suggestions towards the adjustment of the teacher to the social opportunities and needs of pupils in acquiring the typical knowledges, skills, and ideals with which the educative institution is obligated to furnish them.

The author begins with an analysis of the social as the prime feature of human life, and advances the view that the school is not only established by society but is constantly to be regarded as 'an embryonic community.' The twelve chapters easily group themselves into four modes of considering the general problem of filling the 'gap between the school and life.' It is first shown that the school is in need of a thoroughgoing social indictment. "The particular things that are done in the school do not cultivate even a working majority of the habits of action which are used in the world at large" (p. 15). This state of affairs would seem to be due to the over-emphasis in the past of an inadequate individual psychology (p. 3). It can be remedied by inaugurating 'definite social changes in the brains of its members' (p. 9). This appeal to physiological theory becomes even more unfortunate when it is led to speak of 'the social regions of the brain, the language centers' (p. 243) — as though it were possible to distinguish and disregard the purely individual centers as such, or to maintain that there are no individual sensory or motor conditions of sociality. When the author comes to state the import of the social educationally as meaning 'to get the child to feel that he is causing something' in which others share and especially as a member of a self-organizing group of children (pp. 21, 35, 216), he returns to a ground of common understanding and offers his suggestive point of view.

The second group of chapters is devoted to a sketch and criticism of the three leading attempts to make the school socially effective. One of the best features of the book is the interpretation it gives to the school at Abbotsholme, England, the George Junior Republic of Freeville, New York, and the recent experimental school at the University of Chicago, familiarly known as the Dewey School. In each of these there are found 'elements of a high degree of social value and an approximate solution of the problem of educative social organization' (p. 102).

The limitations and inadequacies of these notable experiments provide the way for the third group of chapters ('Self-organized group work,' 'Reasoning and the teaching of arithmetic and science from

the societary standpoint,' 'Reading, language and literature'), which constitute the chief part of the work. Here the author states his special message most clearly and convincingly. By a description of 'cases' of groups of children voluntarily organizing for the satisfaction of particular interests and the solution of special problems, which were tried in various schools in Illinois, Colorado and Massachusetts, it is shown how 'social education' can be developed in 'the average grade school of the times.' Pupil coöperation is to be introduced to a limited extent only, and does not threaten a complete revolution of the school procedure or the elimination of the teacher. It is impossible to summarize here the narratives of these school experiences, which should be read in detail, both by teacher and psychologist. In this part of the work the author very properly forgets the rather extreme consequences of his theoretical discussions which would seem in part to demand that the teacher and the course of study should disappear, and education be turned over to the self-organizing instincts of pupils.

Further application of the social point of view in school work is theoretically presented in the fourth and last group of chapters ('Manual arts: industrial and constructive work,' 'Fine art,' 'The education of the conscience'). The philosophy underlying the general treatment is pragmatism, which seems to be accepted without either defense or apology except that which inheres in the generic demand that education should be serviceable and full of immediate satisfactions (pp. 173, 202, 247, 254). The strictures above noted do not blind us to the special value of the work, which taken as a whole, makes a contribution to the school theory and practice of to-day. The author writes with an attractive and compelling style and sustains the interest to the end.

E. F. Buchner.

Johns Hopkins University.

Linguistic Development and Education. M. V. O'Shea. New York, Macmillan, 1907. Pp. xviii + 346.

This book will be welcomed by all who are interested in the problem of language learning from the beginning of speech to the completion of the university course. To those, however, who are interested only in the narrower problem of the science of language development or in the rules of procedure to be followed in teaching, the book will not be satisfactory. The book contains little that is radically new, but it brings together the facts and principles of physiology, psychology, child study and pedagogy in such a way as to show their

bearing upon every stage of language learning more completely than any other book known to the writer.

The author is familiar with the literature concerning the development of language in children, and with scientific studies of the processes of reading and is acquainted at first hand with these processes as they are carried on at home and at school. One therefore feels that he is speaking not from a theoretical point of view but from that of the experienced parent and teacher.

Part I. treats of the 'Non-reflective Processes in Linguistic Development' and includes chapters on prelinguistic expression, early reaction upon conventional language, parts of speech in early linguistic activity, inflection and word order, and development of meaning for verbal symbols. Part II. on 'Reflective Processes in Linguistic Development' treats of acquisition of word ideas in reading, acquisition of graphic words, development of meaning for word ideas in reading, development of efficiency in oral expression, processes in graphic expression, development of efficiency in graphic composition, and acquisition of a foreign tongue. Each chapter is followed by a summary and at the close of the book is a very good bibliography and index.

Space will not admit of detailed exposition of the many points discussed by the writer. The strong feature of the book is that it shows clearly language learning as a process of habit formation. The author also recognizes the complexity of the processes involved in the understanding and use of language and the necessity of these processes being properly coördinated. All teachers of language from the primary grade to the university should read this book and thus be made to realize that their business is not merely to teach facts of language but to assist in a process of continuous development of language habits.

E. A. KIRKPATRICK.

STATE NORMAL SCHOOL,
FITCHBURG, MASS.

EDUCATIONAL THEORY.

Principles of Secondary Education. Vol. II. Processes of Instruction. CHARLES DE GARMO. New York, Macmillan, 1908. Pp. xi + 200.

Since the universities are generally coming to recognize the need of professional training for secondary teachers, and to hold themselves responsible for it, a series like that of Professor De Garmo is a decided contribution. It may well serve as a groundwork for the embryo

teacher who is considering the 'principles of secondary education' for the first time. It should, however, be regarded only as the means of opening the subject, and should be supplemented by considerable outside reading, if the significance of the principles laid down is to be realized. The work unfortunately lacks a bibliography on each topic, although the references to special works are more numerous in this volume than the first, and the discussions suggested might, in the hands of a skillful teacher, be made to lead to extensive reading. In fact, it may well be that a syllabus and outline somewhat like that of Professor Strayer and coöperating specialists on elementary education would be a better way of presenting this subject than a series of books. Such a treatment would seem to favor the processes of induction, application, and mental activity, which Dr. De Garmo regards as so essential.

The first volume of this series dealt with the studies and the formation of a curriculum; the sub-title of the present work is Processes of Instruction. The author approaches his theories inductively. He first describes the way in which the ordinary person and the scientist acquire and interpret their facts and solve their problems, and then shows how, after proper allowance for his educational status, the same methods will be most natural for the high-school student, and will preserve his interest and secure alertness and vividness. To this he appends a final chapter on current methods and pedagogical positions to verify his conclusions by an appeal to educational experience.

Professor De Garmo may be considered the dean of the newer and more scientific pedagogy in American institutions, and he has possibly produced a greater number of books on education, than any other one writer. Two rather polar faults appear to the present reviewer to occur to some extent in his works. Each may be attributed to his past experience. As a philosopher and former Herbartian, he has a tendency even in a practical work to lean toward abstractions and schemata; while, possibly as a result of habits long fixed by the classroom, his efforts to touch student life and interest tend toward the diffuse and irrelevant. Neither criticism lies seriously against the present work, but the first part, which is almost a treatise on logic, is as much evidence of the one propensity as the stories about the Swarthmore College skeleton and the bequest to the same institution are of the other. But the logic is at least modern in both the theoretical and practical parts of the work, and shows how far Professor De Garmo has broken with the Herbartian propaganda, while the illustrations cited are as stories delightful, and the style of the work is generally

attractive. On the whole, the book is well proportioned and gets at the problems of secondary instruction more specifically than any treatise yet published. The parts relating to the teaching of the old staples of the curriculum — languages and mathematics — are, as in the first volume, especially clear and suggestive, while those on the natural sciences are almost as strong.

FRANK PIERREPONT GRAVES.

OHIO STATE UNIVERSITY.

Principles of Intellectual Education. F. H. MATTHEWS. Cambridge, University Press; New York, Putnam, 1907. Pp. 138.

This book affords a good illustration of the English method of treating educational theory. The conclusions reached, however, seem somewhat in advance of many English books of this character. The doctrine of formal discipline is abandoned for the most part, though it is retained for the purpose of validating certain subjects of study, especially grammar. On p. 14 the author expresses his opinion to the effect that the acquisition of exactness in any one field does not insure exactness in other and different fields, and the principle, he claims, holds in daily life as in the schoolroom. But on p. 77 he makes a plea for the retention of grammar in the curriculum, because "it is a formal study of vast importance in strengthening the abstract power of the mind. It trains observation and thoughtful analysis; it leads on gradually to logic." It seems to the present reviewer that these latter propositions are in direct contrast to positions taken elsewhere in the book.

The author says that the aim of education should be the development of flexibility and exactness in mental function. The former quality gives one insight, originality, breadth of outlook, while the latter insures that we "lose as little effort as possible, always following the safest course to our goal — the correct interpretation of facts laid before us, the drawing of valid conclusions, the separation of the true from the false, the proper adaptation of means to ends" (p. 9). The book is devoted mainly to showing how we may develop these mental qualities in our pupils. The conclusions reached are in large part in accord with contemporary theory in our country.

The Educational Process. A. C. FLESHMAN. Philadelphia, Lippincott, 1908. Pp. 336.

As one goes through this book he can with difficulty convince himself that it has come from the pen of a contemporary American

writer. It reads more like a German book on philosophy, or like some of the books on education which were published in our country thirty or forty years ago when the philosophic spirit was dominant among the few educational writers of that period. The book has little in common with those written from the standpoint of modern educational or child psychology. The author seemingly does not think highly of the contributions which have been made by contemporary science to the whole problem of educational aims, values, and methods. His quotations are mainly from the classic philosophers, or from books on education which are for the most part not much read now in America. This is not to say that the point of view of this book is a profitless one; but it is not in accord with the trend in American education. The present reviewer thinks the book is suited only to those rare individuals who have a speculative and philosophical interest in problems of life and of education. The point involved here may be illustrated by a quotation taken at random (p. 301):

"The logical process traces the absolute intelligence in its movement to self-consciousness, separating itself from itself and returning to itself in order to know and understand itself. The cosmic process reveals the mind principle in nature and unfolds the process by which nature loses its identity and becomes spirit. The spiritual process explains how this estrangement is removed, how spirit identifies itself with itself and how it attains its formal essence, freedom. . . . The primal activity of spirit is to assert itself in contradistinction to the not-self, to separate itself from itself, and to return from this estrangement to itself, enriched and enlarged."

M. V. O'S.

Class Room Management. Its Principles and Technique. WILLIAM CHANDLER BAGLEY. New York, Macmillan, 1907. Pp. 322.

For certain purposes this is probably the best book on class room management that has been published. It is written by one who has had much experience in practical school work in various situations, and who is also well prepared by theoretical study to recognize the larger principles of psychology and pedagogy involved in detailed rules and devices. Part I. treats of routine factors of class room management, giving considerable space to the discussion of routine as related to habits of the individual, economy of energy, rules of the school, arrangement of program, attendance, hygienic conditions and discipline. Part II. treats of judgment in class room management,

discussing problems of attention, technique of class instruction, individual instruction, the testing of results, disposition of the teacher's time, and the teacher's relation to others.

In the appendix are some excellent suggestions for teachers and for those who are observing preparatory to teaching. References to standard educational literature are given at the close of each chapter.

The author has done his work well, describing what should be done and why so clearly that there seems to be little use for a teacher to supplement the text. Its greatest usefulness will therefore probably be found in teachers' reading circles and by teachers who are studying by themselves, and as a reference guide in all training schools for teachers.

Text-book of School and Class Management, Theory and Practice. FELIX ARNOLD. New York, Macmillan, 1908. Pp. 409.

This volume in many respects may well be contrasted with the one by Bagley. In the latter book practice leads and theory explains and justifies, while in Arnold's theory leads and is related to practice chiefly by formal classifications.

The author has read widely both ancient and modern writers on sociology, ethics, psychology and education, but the rules of practice seem to have been derived in part at least from a type of school that is not the ideal of modern writers that he most freely quotes. The formal, systematic character of the book will be indicated by the chapter headings of Part I., 'Principal and Teacher: the Principal;' 'Coöperation between Principal and Teacher: Instruction;' 'Cooperation between Principal and Teacher: Discipline;' 'Coöperation between Principal and Teacher: Supervision.' Topics are usually introduced by a general definition, *e. g.*, the chapter on 'Cooperation between Principal and Teacher' has a formal definition and a half page quotation from Gidding's Sociology on the nature of cooperation. There are many good things said by the author and in quotations, but it seems to the reviewer that there are in the book many things that are obvious or inappropriate.

E. A. KIRKPATRICK.

STATE NORMAL SCHOOL,
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BOOKS RECEIVED FROM FEBRUARY 5 TO MARCH 5.

The Behavior of Noddy and Sooty Terns. J. B. WATSON. Washington, Carnegie Institution, 1909. [Undated. Pp. 187–255 of Publication No. 103.]

Notes on the Development of a Child. II. The Development of the Senses in the First Three Years of Childhood. M. W. SHINN. Berkeley, University of California Press, 1907. Pp. viii + 258.

Arbeit und Rhythmus. K. BUCHER. 4th revised ed. Leipzig and Berlin, Teubner, 1909. Pp. xi + 476.

Les Névroses. P. JANET. Paris, Flammarion, 1909. Pp. 397. 3 fr. 50.

Logique et Mathématique. Essai historique et critique sur le nombre infini. A. REYMOND. Saint-Blaise, Foyer Solidariste, 1908. Pp. 219. 5 fr.

Anti-Pragmatisme: examen des droits respectifs de l Aristocratie intellectuelle et de la Démocratie sociale. A. SCHINZ. Paris, Alcan, 1909. Pp. 310. 5 fr.

Philosophische Strömungen der Gegenwart. L. STEIN. Stuttgart, Enke, 1908. Pp. xvi + 452.

Practical Diatetics, with Reference to Diet and Disease. A. F. PATTEE. Fifth ed. New York, the author, 1908. Pp. xvi + 312.

NOTES AND NEWS.

THE Sixth International Congress of Psychology will meet in Geneva, August 3–7, an informal gathering taking place on the evening of August 2. The program includes discussion of general and special topics, questions of standardization, demonstration of apparatus, and individual papers. The general topics to be discussed are feelings ('sentiments,' by Külpe and Sollier), subconsciousness (Dessoir, Janet, Prince), measure of attention (Patrizi, Ziehen), religious psychology (Höffding, Leuba); the special topics are the psychopedagogical classification of backward scholars (Decroly, Ferrari, Heller, Witmer), methodology of pedagogical psychology (Ioteyko), tropisms (Bohn, F. Darwin, Jennings, Loeb), orientation at a distance

(Thauziès), perception of position and movement of our body and limbs (Bourdon). Under standardization will be included terminology, standard colors, enumeration of errors in testimony experiments, notation of age of children, mathematical determination of numerical results of experiments. A later program will give the list of individual papers. Applications for membership should be addressed to the secretary (Ed. Claparède, 11 Avenue de Champel, Geneva) and should be accompanied by money order for dues (20 fr.) to the treasurer (Lucien Cellérier, Montchoisy, Geneva). Professor Th. Flournoy is the president of the Congress.

PROFESSOR LIGHTNER WITMER, of the University of Pennsylvania, is giving this term a course of lectures on psychology to the fourth year students of the medical department.

PROFESSOR A. L. JONES, preceptor in philosophy at Princeton University, has been called to Columbia University, where he will be head of the new committee on admission of undergraduates.

DR. W. A. NAGEL, assistant professor of sense physiology at Berlin University, has been appointed full professor at Rostock University. He is succeeded at Berlin by Dr. H. Piper.

THE State University of Iowa celebrated the Darwin Centennial by two addresses at the assembly of all colleges. Professor C. C. Nutting spoke upon the personal traits of Darwin, and Professor T. H. MacBride upon his contributions to botany. The Baconian Club devoted its evening program to the memory of Darwin and addresses were made on his contributions to zoölogy, botany, and psychology by Professors G. L. Houser, B. F. Shimek, and C. E. Seashore respectively. — A series of lectures on Darwinism is being given at the University of Chicago, Professors Angell and Mead speaking for Psychology and Philosophy. — The American Philosophical Society of Philadelphia holds its annual meeting April 22–24, and three addresses in commemoration of Darwin will be delivered on the evening of the 23d, by Ambassador Bryce, Professor Goodale, of Harvard, and Professor Baldwin, of the Johns Hopkins.

WE record the death of Victor Egger, Professor of Philosophy at the Sorbonne, Paris, and that of President Carroll D. Wright, of Clark College, Mass.

DURING Professor Baldwin's temporary absence in Mexico MS. for the REVIEW may be sent to Professor J. B. Watson, Johns Hopkins University, Baltimore.

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THE

PSYCHOLOGICAL BULLETIN

THE STUDY AND TREATMENT OF RETARDATION: A FIELD OF APPLIED PSYCHOLOGY.

BY LIGHTNER WITMER, PH.D.,

University of Pennsylvania.

No valid distinction can be made between a pure and an applied science. That "the final test of the value of what is called science is its applicability" is the opinion of a former president of the American Association for the Advancement of Science. This thought impelled me as long ago as the meeting of 1896, to lay before the members of the American Psychological Association an outline of a field of applied psychology. Under the designation of practical work in psychology was included: (1) The direct application of psychological methods to therapeutics and to education, whether by professional psychologists, practicing physicians, or educators. (2) Such psychophysical investigation of mental conditions and processes as may serve to throw light upon the problems presented in the practice of medicine or teaching. (3) Instruction in psychology containing the promise of usefulness to students of medicine and education in their respective professions.

Thus the plan had a view to the professional practice of psychology, to research and to instruction, as these stand related to the two professions of medicine and teaching.

During the twelve years which followed the first announcement of this plan of practical work, the Laboratory of Psychology at the University of Pennsylvania has been engaged in prosecuting original research along these lines, and in training investigators capable of carrying on independent work. Sufficient time has now elapsed to present a statement of what has been accomplished.

In the prospectus to which I have referred, I suggested the necessity of a psychological clinic, or dispensary, which I had recently organized at the University of Pennsylvania, and which has since been

continued, receiving children from the public schools, from the juvenile court, charitable organizations, and from physicians. This work has grown year by year until at the present time we are seeing from six to ten new cases each week. In the examination and treatment of cases referred to the psychological clinic, I am assisted by three medical associates and a number of psychological assistants, including Dr. Holmes, who is specializing in the direction of the moral training of adolescents, and Miss Town, who is resident psychologist at the Friends' Asylum for the Insane.

Although the necessity of keeping these children under observation and prolonged training had led me to recommend the establishment of schools or homes for those children needing expert psychological and pedagogical treatment, it was not until July, 1907, that I was able to establish on a satisfactory basis what I originally called a hospital school, but more recently the Orthogenic School. This school is conducted by the Psychological Laboratory, as a medical school conducts a hospital, both for private and free cases. Through the psychological clinic, but chiefly in the orthogenic school, a number of cases have been under such prolonged observation and training that it is now possible to present reports which will show the mental and physical status of the child at the time he was received into the school, the methods of training and physical treatment employed, and the results which followed such treatment. Primarily for the purpose of reporting these cases in a satisfactory manner, the publication of a journal called *The Psychological Clinic* was undertaken in March, 1907.

I have recently proposed the word *orthogenics* as the name for that branch of science which investigates retardation and deviation and the methods of restoring to normal condition those who are found for one reason or another to be retarded or deviate. Through the reporting in this journal of our work at the University of Pennsylvania, and of such independent work as that of Dr. Margaret K. Smith, of New Paltz, New York, and of Dr. Sterling, of Baltimore, we believe we are contributing to the establishment of a clinical psychology as a department of orthogenics.

The characteristic features of the clinical method in psychology are :

1. Its concern for the individual, which makes it in effect an individual psychology ; and

2. The application of remedial or orthogenic treatment to individual cases of retardation or deviation, and even to the hypothetically normal child.

A comparative psychology may be based upon a study of indi-

viduals or upon a study of groups of individuals; that is to say, upon the clinical method primarily or the statistical method primarily. Accomplishments of the statistical method are admirably shown in such investigations as have proceeded from or been inspired by Cattell and Thorndike. But the statistical method is susceptible of great error, as Thorndike has pointed out in his report on elimination. He claims that to settle the question of elimination from the grades, it would be necessary to follow a large number of individual children through the eight grades of the school and through the high school. In other words, he proposes to develop a statistical result on the basis of an individual psychology and from an application of the clinical method. The germ of this method is undoubtedly to be found in the remarkable investigations initiated by Dr. Hall through the employment of a syllabus. At the University of Pennsylvania we realized the necessity for obtaining statistical data through the clinical method as soon as we sought to determine the number of backward children in the public schools. This work has produced results of value and has led to a restatement of the problem of retardation.

It is well known that Séguin was the first to subsume idiocy under the concept of retardation. He defined idiocy as an arrest, or retardation of development. He himself distinguished between idiotism as the mental state and idiocy as the brain defect upon which idiotism might rest, a distinction which suggests the possibility that idiotism may be a mental status not resting upon an incurable brain defect. As soon as a civilized community begins to enforce compulsory education it is discovered that there are a number of children unable to make normal progress through the grades. How many such children are there in the public schools?

This question cannot be answered by a clinical examination alone. It must be solved, in the first instance, by what is essentially the statistical method, as this has been developed by Cattell and Thorndike. I am led, therefore, to distinguish between psychophysiological retardation and pedagogical retardation. Physiological retardation may be defined in two ways, either as a failure of the child to reach the supposed normal level of development for his chronological age, or as a failure of the child to reach the development indicated by his natural endowments. Any child who reaches adult age without having had his brain developed up to the full limit of its capacity has suffered from retardation and will manifest throughout his life an arrest of development. It is possible that the brightest member of a class may be more retarded than the dullest. I believe that these two definitions

of retardation should be kept separate, but neither of these is a satisfactory definition with which to approach the problem of retardation in the schools. Our standard of the hypothetical normal child is inadequate and unsatisfactory, and our opinion as to whether a child at a given stage of development is as far along as he ought to be must necessarily be a matter of conjecture. To fix the standard of retardation I undertook to define pedagogical retardation with reference to the number of years that a child was behind the grade for his age. This involved a statistical classification of the children of a public school system by grades and ages.

Superintendent Bryan undertook this investigation for the city of Camden, N. J. He found that 26 per cent. were two years or more behind the grade in which their age should have placed them; that 12.7 per cent. were three years or more behind the proper grade, and nearly 5 per cent. were four years or more behind grade. Indeed, backwardness or retardation, measured in terms of school progress, is manifested by a surprisingly large percentage of children. Thus, Dr. Cornman shows for five cities of the United States, comprising one fifth of the elementary school population, that from 21.6 per cent. to 49.6 per cent. are one year or more behind the grade in which the school and the public expects these children to be; that from 7.3 per cent. to 26.3 per cent. are two years behind the proper grade; that from 2.1 per cent. in one city to 12.7 per cent. in another city are three years or more behind grade; and in one city as high as 5.1 per cent. are four years or more behind the grade in which these children should be.

A great deal of confusion exists in the mind of the people, and also in that of our educational authorities, as to exactly what a backward child is. Just as soon as the discovery is made that some children manifest backwardness or retardation in their school work, and special classes are formed to facilitate the progress of these children, we find these classes filled up with children who are incurably feeble-minded, who cannot be trained in public day schools and who should be sent for training and care to some special school like that at Elwyn. Thus, I have brought to me at the University of Pennsylvania for examination and suggestion as to educational treatment, children who have been rejected from the Pennsylvania Training School for Feeble-minded Children, because they were below the level of children who could be educated in that school. And yet these children were applying for admission to the public schools, and in some instances were to be found in the grades for normal children.

This failure to recognize that there is a difference between feeble-minded children who cannot be educated in public day schools and other children properly designated backward, who can be trained in day schools and some of whom can be restored to normal condition, results in the calling of many incurably feeble-minded children, 'backward children.' However justifiable this may be to save the sensibilities of the parents, it simply confuses the problem of remedying the backwardness which is found throughout the grades in many of our city schools.

Independently, Dr. Falkner, while Commissioner of Education for Porto Rico, and Mr. Ayres, while Superintendent of Schools at San Juan, came upon this problem from the standpoint of a superintendent. Endeavoring to compare the schools of Porto Rico with those of the United States, they could find no statistics which would enable them to determine whether the pedagogical retardation of children in the Porto Rican schools was greater or less than that prevailing in city school systems in the United States. It was not until they obtained the statistics of Bryan and Cornman that they had the material data for a preliminary statistical comparison and analysis of conditions. They are now in the position, Dr. Falkner as statistician for the Immigration Commission, and Mr. Ayres as Director of the Backward Children Investigation of the Russell Sage Foundation, to contribute results which will be determinative for the schools of this country. Mr. Ayres is employing the clinical method also, in connection with his statistical investigation.

Recently, the Russell Sage Foundation persuaded Dr. Gulick also to devote himself to this work, and we look to this Foundation to do as important a piece of work in connection with the problem of retardation in the public schools, as the Rockefeller Institute is expected to accomplish in the study and treatment of disease. In our work and the work of Twitmyer, Bryan, Cornman, Heilman, Thorndike, Gulick, Ayres and Falkner, we see the foundations of a new science. It is strictly an applied psychology. It may be designated also as experimental or scientific pedagogy in the proper sense of that word.

From the cultivation of this field of applied psychology we expect results of value to psychology and education for the following reasons: (1) The investigation of retardation, which measures the amount by which individual children fall short of obtaining a standard public school education, is an approach to the problem of education from the right direction. These investigations will furnish standards of reference which will enable us to determine to what extent we fail to really

educate the rising generation in this country. (2) These investigations are demonstrating to educators the necessity of calling upon the pyschological expert to assist in solving their peculiar problems. In Philadelphia merely publishing the fact that 12.7 per cent. of the children of Philadelphia had been more than two years in grade in June, 1907, reduced the number of such children in June, 1908, to 6.6 per cent. (3) It offers to superintendents, through both the statistical and clinical methods, and to grade teachers, through the clinical method alone, an opportunity to do practical work, as a result of which they may become original contributors to the science of psychology and to education. (4) This will ultimately make the profession of teaching a scientific profession, which it is not at present, because educational practice remains to-day largely a matter of opinion. Medicine is a scientific profession because of the invention of instruments of precision like the thermometer and because of the development of exact methods of observation and report. I look forward to the day when the educator will also be looked up to as a scientific authority whose opinions will either no longer be questioned by a foolish parent or some ignorant member of a school board, or else, if questioned, can be supported by an appeal to unanswerable facts. (5) The development of an applied psychology assures the future of psychology as a pure science, for in the final analysis the progress of psychology as of every other science will be determined by the value and amount of its contributions to the advancement of the human race. Let us hope that we are even now escaped from beneath the pall of such debilitating opinions as the one attributed to William James: "Perhaps you will ask me what are the practical benefits conferred on the world by this interesting science. So far as I am able to discern, absolutely none." (6) Through applied psychology, in training psychological experts for our public school systems as well as for institutions for the insane and the training of feeble-minded children, we shall find another outlet for our students than that which leads them to the gateway of an academic career.

JUVENILE DELINQUENCY AND JUVENILE CONTROL.

BY EDGAR JAMES SWIFT,

Washington University, St. Louis.

Mankind is prone to be either predominantly scientific in its judgments or excessively emotional, and it is because juvenile delinquency appeals so strongly to the latter type of mind that its literature is largely of the emotional sort. This makes many of the books useless as a guide for action, because emotional therapeutics have little remedial value in the social maladies of boyhood. It would not be correct to say that boys are emotionally unresponsive, but their emotions are of the primitive kind. The civilized emotions are either too modernly ethical, directed toward a social benefit so far removed from the immediate interest of boys as to have no vital meaning for them, or too attenuated to appeal to their vigorous racial standards. For this reason the best literature on juvenile control must be sought in the writings of men who approach the problem through the ideals and inherited tendencies of the boys themselves, the only gateway to their inner life. Permission to a boy to tour the state on freight trains, under certain stipulated conditions, would seem to many a hazardous method of reformation, yet that is what Judge Lindsey did,[1] and the best part of the story is that it proved of prophylactic value where officinal remedies had failed. Boys respond with amazing fidelity to responsibility when it is unreservedly and frankly put upon them, because adaptation is characteristic of childhood, but when the mailed hand is visible through a thin coating of responsibility they discover the pretense, and their adaptation then takes the form of self-protecting deception. The reaction of boys is of much the same sort as the action of their elders toward them. This defensive response is a part of their racial inheritance. Judge Lindsey recognizes the vested interests of the race in its primitive instincts. For this reason boys who are honest with no one else tell him the truth.

Self-assertion, obedience to no laws save those which the individual has imposed upon himself, is the modern expression of primitive egoism and its source lies far back among our animal ancestors. Vanity,

[1] 'Problems of the Children and How the State of Colorado Cares for Them,' A Report of the Juvenile Court of Denver.

to which pupil government owes much of its attraction, is a very ancient instinct, long antedating man himself, and its tenacious hold upon the race makes it one of the most vulnerable points of attack in children. They feel immeasurable joy in the display of power, and they revel in the consciousness of personal responsibility. No particular scheme of self-government is essential to success, but the pupils must feel that the responsibility is actually theirs, and there must be enough machinery in the plan to give them something to manage. 'The School City' meets these requirements and the plan as formulated in the reports[1] makes an excellent center from which such deviations may be made as local conditions suggest.

A variety of occupations also assists in eliminating the mental resistance by offering a more extensive field for individual initiative and control, and by giving a larger field of responsibility through having more machinery to manage. This is one of the reasons why the Thompson's Island Farm and Trades School,[2] Boston Harbor, the George Junior Republic,[3] and the Carter Republic,[4] have had such remarkable success. Cronson's plan[5] of self-government supplies this need of machinery by truancy, patrol, and health squads.

Among the many books on delinquency, intended as a guide in handling boys, *The Boy Problem*,[6] of which a new edition has just appeared, and *Winning the Boy*,[7] are the most serviceable. The first derives its value from the study of the evolution of the child, which the author made before writing the book, while the second partakes of the spirit of the Denver master with whom Dr. Merrill was for several years associated.

Those who have studied criminology are not surprised by the statement in *The Young Malefactor*[8] that hardly more than two per cent. of first court offenders are criminals by nature. This book is decidedly valuable because the lay reader is not confused, as in so many other scientific books on the young criminal, by a mass of facts and statistics about abnormal cases. Dr. Travis shows at the outset that abnormal children — the criminals by nature — constitute a very small propor-

[1] Wilson L. Gill, 340 W. Duval St., Germantown, Pa,

[2] Reports of the Board of Managers, Tucker Deland, Secretary, 19 Exchange Place, Boston.

[3] Reports of the George Junior Republic, Freeville, N. Y.

[4] Reports of the William T. Carter Republic, Redington, Pa.

[5] *Pupil Self-Government*, by Bernard Cronson, The Macmillan Co.

[6] W. B. Forbush, The Pilgrim Press, Chicago.

[7] Lilburn Merrill, Fleming H. Revell Co.

[8] Thomas Travis, Thomas Y. Crowell & Co.

tion of the actual cases, and then, by a study of social hygiene, he proceeds to put upon society, where it properly belongs, the responsibility for transforming the others into criminals.

The problems involved in school discipline, and in creating an interest in study, are so intricately interwoven with the general attitude of children toward their teacher and their work that juvenile delinquents are only somewhat extreme instances of the cases with which teachers are daily confronted. For this reason the reports of the juvenile courts of Denver, Salt Lake City, and Indianapolis, as well as the 'Children's Courts in the United States,'[1] are especially valuable for those desirous of understanding boys. Remedial treatment of unusual curative value in extreme disease cannot be bad precautionary measures in less virulent forms of the malady. The juvenile courts which have reformed most of the boys brought before them, instead of making them into habitual criminals, have succeeded because their officers know how to utilize racial instincts in the mental and moral development of children. This is what makes their report pre-eminent in the literature of juvenile control.

[1] House Document No. 171, 2d Session, 58th Congress.

AN ATTEMPT TO DEFINE THE TERMS USED IN CONNECTION WITH RIGHT-HANDEDNESS.

BY ERNEST JONES, M.D., M.R.C.P. (LOND.),

Demonstrator in Psychiatry, University of Toronto.

Any attempt to discuss the nature of the physiological features concerned in the problems of right and left-handedness is greatly hampered by the lack of precision in the nomenclature of the subject and by the number of different meanings with which most of the terms are at present invested. The object of the present note is to try to discover how far uniformity of meaning may be attained in the scientific use of these terms with the minimum of estrangement from the connotation in which they are currently employed. In a number of instances attributes supposed to be characteristic of various organs and functions of the body have been metaphorically applied to mental processes — we thus speak of a splenetic temperament, a hearty greeting, a short-sighted judgment, etc. — but in no sphere except in that of manual aptitude has this led to any noticeable confusion, the metaphorical nature of the expression being usually obvious.

The special capacity of the normal right hand, forming as it does a natural standard of aptitude, has given rise to a series of words etymologically based on this fact, but now only by metaphor connected therewith, and often used to denote intellectual or even moral superiority. Expressions built from the word 'hand,' such as, a handy implement, a right-hand assistant, a left-handed transaction, etc., give rise to little or no confusion, but the case is otherwise with those built from the Greek and Latin root 'dexter.' The latter includes a large number of terms, many of which are indispensable for certain purposes, and it is with these that we are here concerned. The current connotations attached to them are cited from Murray's Oxford English Dictionary, for this is by far the most complete work of the kind extant, and the New Century and other dictionaries contain no material that is not given there.

A. *Right-sidedness.* — If any adjective other than the simple English one of right-sided be required to denote this attribute, it should be the word 'dexter.' This adjective has been used in five different connotations, but all except that of right-sided are obsolete. Two

other adjectives, 'dextral' and 'dexterous,' are sometimes also used for this purpose, but this use of them seems objectionable, because not only is it superfluous but it tends to lead to confusion with other connotations of the same terms.

B. *The Special Capacity Characteristic of the Normal Right Hand.* — So far as I know there is no expression in use for the designation of this important and peculiar capacity. I would suggest that the term 'dextrality' be used for this purpose,[1] for it is a rare word and is usually employed as an unnecessary synonym for the simple English expression right-handedness. 'Dextral' would then signify precisely 'pertaining to the excess of aptitude which one of the two hands, usually the right, normally acquires.' The group of functions in respect to which this excess of aptitude is acquired may thus be called dextral functions. At present the adjective 'dextral' is rarely used, and only to indicate 'on the right side,' a use which, as mentioned above, is entirely superfluous.[2] 'Dextrally,' which now means 'to the right' would then signify 'in a manner characteristic of the normal right hand.'

C. *General Adroitness comparable with Dextrality.* — This may refer to either manual skill or mental expertness, and the expression in question is clearly a metaphorical one. 'Dextrous' (var. dexterous, dexterious), seems marked out by its characteristic plenary termination for use in this metaphorical sense of 'full of right-handedness.' The term has been used in seven different connotations. All these are obsolete except the one here indicated, though it is still sometimes used unnecessarily to signify right-handed. 'Dextrously' is used as the corresponding adverb, though it also is occasionally used to signify 'with the right hand.' 'Dextrousness' is obviously the corresponding substantive and should be confined to the metaphorical sense of indicating 'an excess of aptitude over the normal in any given function to which it is applied, comparable with that excess over the left hand characteristic of the normal right.' This of course is the current connotation of the word. 'Dexterical' is sometimes used as a synonym for dextrous; it seems an unnecessary word unless it be

[1] This definition of 'dextrality' nearly resembles that given by Professor Baldwin in his *Mental Development in the Child and the Race*, 3d ed., 1906, p. 56, where he suggests that the term be used to denote 'the general fact of uneven-handedness.'

[2] This older usage has been recently urged by Gould (*Righthandedness and Lefthandedness*, 1908, p. 206). He would speak of the dextral and sinistral hands as synonyms for the right and left hands, but does not mention any advantage to be gained thereby.

found convenient to employ it to indicate manual adroitness as distinct from mental.

In the above account it will be noticed that definition of the commonest word of the group, 'dexterity,' is omitted. This word has been used in five different senses, the commonest being synonymous with dextrousness. It has entered so fully into common speech that it seems to me impossible to rescue it for any scientific purpose; it must therefore be recognized that it is a non-scientific expression used with no precise connotation.

Examples of the connotations above defined are best given by describing the common facts of right-handedness in the terms in question. Thus, in the normal person the dextral hand is the right, in a small number it is the left, and in a still smaller number both hands are dextral. All individuals can from this point of view be divided into three groups:

1. *Unidextrals.* — There are two subgroups (*a*) dextro-dextrals or right-handed individuals, dextrality being confined to the right side, and (*b*) sinistro-dextrals, left-handed individuals.

2. *Ambidextrals.* — Dextral functions here are performed equally well on either side. Ambidextral is a more accurate designation for this purpose than ambidextrous, which should be used only to signify an exceptional aptitude on both sides; so also is ambidextrality a more precise term than ambidexterity.

3. *Bi-dextrals.* — Some dextral functions are performed best on the right side, others on the left. A typical instance is the average left-handed individual, who bowls better with the left hand but writes better with the right. Strictly speaking, the majority of mankind are bi-dextral, for it is exceptional to find a right-handed individual who does not perform some action better with the left hand. Still it is preferable to restrict the term to indicate only those individuals in whom the *important* dextral functions are best performed, some on one side and some on the other.

It is of course generally accepted that all individuals primarily belong to the first group, the second and third being the results of education.

PSYCHOLOGICAL LITERATURE.

GENETIC LOGIC.

Thought and Things or Genetic Logic. Vol. II. Experimental Logic or Genetic Theory of Thought. JAMES MARK BALDWIN. London, Swan Sonnenschein & Co.; New York, Macmillan Co., 1908. Pp. 436 + xv.

This second volume, while lacking nothing in organic unity, contains a wealth of topics of which a review can give no adequate idea. Professor Baldwin has shed new light upon many old logical problems and (what is rare enough in logical treatises) has really contributed to our knowledge in several respects. These contributions, some of which we shall indicate later, together with a broad-mindedness which can combine opposite extremes of theory, are, in our view, the chief merits of the work. There is no recent book in English which has covered the field so fully, in so empirical a spirit, yet with such philosophical and logical power of interpretation. The 'pragmatic' works were constructive, and empirical, yet certainly without taking in as many facts or recognizing as many human needs and interests. The author is able to find a place for the practical, theoretic, esthetic, social, even 'logistic' motives that enter into human thought, to justify each and to restrain each to its proper limits. One must admit, however, that his exposition is difficult: and this is not owing merely to the numerous technical terms. We do not object to those terms; the future alone can decide that. Meanwhile we find most of them, at any rate, useful, even necessary. Such terms as 'presumption,' 'assumption,' 'imported' and 'essential singularity,' 'syndoxic,' 'synnomic' and many others, one quickly gets used to; and they designate indispensable distinctions. The style however is difficult in itself: in view of the importance of Professor Baldwin's work, we wish that he would expand some of the chapters: *e. g.*, Ch. III., the first half of Ch. IV., certain parts of Ch. VI., and other shorter passages. While the text is harder than that of Vol. I., it is a work on a larger scale, and is, we believe, correspondingly more important — though of course the two cannot really be separated.

In Vol. I. we saw the mind learning the use of its imagination, and the distinction of inner and outer, subject and object. It is accordingly now able consciously to apply the inner imagined object, the

idea, to the outer reality: this is judgment, and constitutes the 'logical' stage. The application of idea to reality is always more or less experimental (hence this volume's title). It is a stage of explicit dualisms: idea proposed (schematism), and belief or disbelief resulting from its application to reality; content and 'control'; conscious assumption (Meinong's *Annahme*) and 'presupposition' or belief, and other pairs.

The subject is expanded in detail along two lines: development of the content-side and of the belief or control-side. A short chapter (pp. 3–13) defining the logical stage constitutes Part I., 'Introduction.' Part II., 'Genetic Theory of Thought, How Thinking Goes On,' contains the main contributions to theory of judgment. Roughly speaking, Chs. II.–V. treat the control-side, Chs. VI.–IX. the content-side. The passage from prelogical reality-feeling to judgment is as follows: Originally the child has 'only the sense of presence' (p. 22). Doubt then arises, leading to 'schematism' which when followed by belief gives judgment. "... rivalries, embarrassments, hesitations, and adjustments of alternative meanings ... are the occasion of judgment, and with it reality-feeling passes into belief" (p. 22). "Between them are the various modes of hesitation, caution, doubt, etc." (p. 22, footnote). Accepting Bradley's definition of judgment, as the author does (p. 7, footnote), one may follow this account of the genesis of judgment. But suppose one accepts a definition like Wundt's, Sigwart's, Jerusalem's, or some other? We should like to see more evidence that judgment is preëminently the kind of process here generated: no doubt Professor Baldwin is prepared to give such proofs.

Two other views of judgment, to be sure, are discussed and incorporated into his own: and it is a triumph of genetic method in his hands, to have united Brentano's with the predication theory (p. 31 ff.). Yet we do not quite understand the statement that while *existence* is a predicate of the existential judgment, it is 'not an attributal predicate' (p. 17). How does a predicate differ from an attribute, and how can an assertion form part of its own object?

On the control-side, we find the following modes of belief: assertorial judgment, about objects real or unreal, having maximum certainty: problematic judgment, with minimum certainty: and disjunctive and conditional between the two, with less and greater certainty respectively. Judgments about unreal objects refer always to some sphere of reality, *i. e.*, fiction, psychical fact, etc., and appreciative judgments are always assertorial (p. 44). Near to problematic judgments are the 'semblant' judgments or assumptions of the prelogical modes: strictly speaking however "we are not able to describe such

meanings as judgments; they do not fulfil the belief criterion" (p. 48). Here too belong such questions as are mere proposals. The order of genesis is from semblance onward, in increasing degree of certainty. ". . . genetically the order is from the wider disjunctive to the narrower categorical" (p. 49, footnote — see also pp. 258–259). From disjunctive judgments, with their whole from which a part is chosen, comes knowledge of general, particular, and of mutual exclusion or mutual dependence — the conditional judgment. This, the next higher mode, is 'belief in the details of an uncertain whole,' while the disjunctive was belief in a whole of uncertain details (p. 53). Here, very naturally, the mind learns the difference between the content and the belief or control. So this is the heart of the logical stage. "It is peculiarly a meaning of reflection because it marks and proceeds upon this distinction" (p. 55). Here develop the characteristic logical secretions of *ground*, *implication*, *validity*, etc. This chapter is a masterpiece of genetic method and logical fertility.

Ch. III., 'Common Acceptance and Acknowledgment,' develops the social motives and is unusually difficult. It traces the growth from 'syndoxic' to 'synnomic' or 'appropriate' thought. "A single mind always takes its experience as such — the world of established ideas organized in a system of judgments — to be at the same time the experience or world of ideas of other minds as well, so far as they have the same data to go upon" (p. 61). This is 'syndoxic' thinking: 'synnomic' is 'syndoxic without being also of necessity aggregate or catholic' (p. 72). How does the child learn to do that? Very roughly, as follows: He finds that he can, by imitation of others, putting himself in their place, anticipate their judgments upon objects of his thought as yet unshared with them: the private judgment thus comes to be, that which *could be* common even though it is not. The same he finds true of others' private judgments: they can be, even though they are not, confirmed by him. Thus he learns that judgments may be 'syndoxic' without being actually shared with others. And in doing this he has developed his own sense of private judgment. "The private thought is not a cognitive unit, it is a cognitive outcome" (p. 105). The details of the proof are intricate, and of several of the points more than one proof is given. As was suggested above, we wish, in view of its importance, that the author would expand and clarify it in another work.

Ch. IV., 'Acknowledgment of the Problematical as Disjunctive,' takes up again the development of the belief-categories. The disjunctive has belief or 'presupposition,' the conditional only 'postulation.'

Between the extremes of *all A is B* and *this A is B* (quantity being, as above hinted, derived from the disjunctive) lie all grades of probability or degree of belief. In connection with quantity we read that some universal judgments are not truly quantified, but are intensive. So 'virtue is praiseworthy' is not a quantified universal; 'your act is commendable' need not be a quantified singular (p. 122). This treatment we believe is fairer to our actual meanings and thoughts than that of Bradley and others. The *question* is a disjunctive judgment with the belief-mode made explicit: and thus questions, as embodying probability, have quantity. For example: "Is it a fish?" (As likely as not.) "It's not a fish, is it?" (Few are.) "*What* is it?" (Bare possibility of being a fish) (p. 125). We commend particularly this analysis of the *question*.

The problem about the existence of the subject in universal judgments is answered thus: in all quantified judgments the subject exists, in unquantified, not so (p. 130). Individuals have no exclusive title to existence. 'Why may not all of a class exist?' (p. 131). So they may, if it is a finite collection, we reply: but how about infinite collections, such as all moments of time? Even the 'enumerative' or extensional universal seems often (though certainly not always) non-existential.

Ch. V., 'Contingent Meaning with Postulation,' takes up the next higher grade of belief. In conditional judgment the control is indefinite. There is (p. 135) a 'two-fold reference': it "serves to convey an implication, a presupposition of real existence" in some sphere: "but it also serves merely to suggest a relation, the control being left for further postulation or assumption." "The content is an implication but the control may be left subject to postulation" (p. 135). *Implication* is thus the prime category here; it is a relation between meanings. In this stage, as a peculiarly logical one, the experimental character is especially explicit: we postulate a meaning, to experiment with it, and get its implications.

Ch. VI., 'The Development of Logical Meaning: Predication and Intercourse,' studies the expression of judgment in language, yet confessedly in but one or two aspects. The one great factor which 'fixes genetically both the social motive and the experimental motive' is language (p. 141). This chapter is best regarded, we think, as an extension of Ch. III. The dualism of the logical stage is prettily worked out. Language is both dynamic and static; it expresses personal and changing views ('proposal') and it approximates, in social usage, fixed ideal meanings (elucidation of already known meanings).

According as speaker or hearer do one or the other we have acceptance or question (p. 152). The proposal-character makes truth 'experimental to the last' (p. 155). The most certain statements are true in the most restricted fields (pp. 157–9). One great problem, however, we do not find treated: why is language predicative, and how far does this correspond with the psychical make-up of judgment, or the ideal logical make-up? In this connection it is well noted that many habitual utterances, apparently linguistic expressions of judgment, are not such, since they lack the character of 'proposal' or 'schematism.' Thus, not every sentence is a proposition. As regards the refutation of 'absolute' truth (p. 158 ff.), whether *a priori* universal or singular and private, we do not see how it would meet Professor Royce's position, that *whatever* your proposal it leads to the same result, that result being then absolute. It seems to us that Professor Baldwin in the absence of a proof of close correspondence between thought and language, has proved only that one's statements can never be regarded by others as absolutely sound, without their own verification. Thus, the private or unconfirmed is mere proposal (p. 160) to others: to me it is absolute.

Ch. VII., 'Development of Logical Meaning: Predication by the Term,' brings the young mind to the platform of formal logic. The *proposal* must be justified, by further developments of meaning. These are precipitated in three, which form part of the content: term, proposition, and inference. Why this particular precipitation occurs, we hope the author will some day tell us: it is a delicate problem of genesis. *Terms* are learned by abstraction, which is not, the author very well insists, an underived primitive function, but is an outgrowth, from judgments upon selected contents (p. 186). In this connection is the (to the reviewer at least) welcome doctrine, that abstraction is not necessarily damaging (p. 187) for truth itself is abstract. With knowledge of the abstract comes intension, and with that of the general, extension: here belongs the whole doctrine of terms. The treatment is very full, acute, and we believe sound. Particularly noticeable is the lateness of the singular meaning. 'There is no prelogical singular meaning' (p. 198). This agrees with the results of Meumann and others. Both general and singular are late, if not derived, meanings.

Chapter VIII. on the 'Proposition' gives the categories of quality. The proposition is defined as "the linguistic embodiment of the relational aspects of a conceptual meaning, made object of thought and means of intercourse" (p. 211). We agree: but which are we to study, the embodiment or the meaning? We cannot help feeling that

Professor Baldwin has made the meaning follow the embodiment a little too closely; particularly as to the duality of terms. We believe in that: but, *e. g.*, the impersonal proposition should, we think, receive separate examination. The six groups of categories, however, seem to us beautifully empirical, and to deserve better than the Kantian list: Modality, quantity, community (by whom), community (for whom), quality, relation. Best in this chapter, however, seems to us the genesis of the negative categories out of a primitive relatedness or otherness (focus and margin). Every logician should study this carefully; we believe it the best work yet done on the negative. It gives to it a more fundamental position than has been usually assigned: agreeing more nearly with the results of Groos, Schrader, and others.

Ch. IX., on 'The Import and Characters' of the proposition, treats the analytic-synthetic problem, with no markedly new result: and states that "all propositions have existential reference" to some sphere of existence (p. 255) at the same time going further than many logicians in claiming that neither affirmation nor denial, nor the degree of quantity, make any difference as to the reference to existence. We welcome this doctrine, with the exception of the criticism already suggested about universals.

A special study of the peculiar logical character called *implication* occupies Part III., 'Theory of Implication: Logical Validity.' Of this very full discussion we can do no more than single out a few points that seem to us most important. The mind has learned to isolate relations, and particularly the relation of sameness, on which all reasoning depends. *Validity* is that property by which the content, *Truth* by which the control, realizes the ideal, *Correctness* (p. 281). There are no principles of reason over and above things; *e. g.*, the law of identity is simply an aspect of individuation. "We may . . . define necessity as that intent of the relation between particular and general in virtue of which but one universal judgment of identity can be used to render all the particulars." "Each particular *must in the same sense mean the whole*" (p. 313). *Logistic theory* is (we think rightly) criticized for attempting so complete a divorce between fact and ideal, that it can be of no effectiveness (p. 330).

Part IV., 'The Dualisms and Limitations of Thought,' is of mainly philosophical interest. It criticizes, in Ch. XIII., current pragmatic views from their own psychological ground (as is only right) and finds them on the whole one-sided. Ch. XIV., 'Control through Knowledge,' and Ch. XV., 'Reflection as Self-made,' shows three ways in which thought fails to reach its goal: singular objects, the

thinking subject, and all schematism or intent of judgment, cannot be described (p. 418).

There is much detail, not noticed herein, in all the chapters. The volume might be expanded to two or three, with yet the same material. Particularly useful are the tables in Appendix I. (pp. 419, 420), and in Appendix II. the reply to criticisms, as throwing light on the author's general position. It is not easy to say which of the author's special views seem to us most important: on the whole, however, we think the dualism of content and control is probably the most fertile contribution. Professor Baldwin says of the dualism of belief and assumption or 'schematic' and general (which corresponds to that of control and content), that it is "one destined to prove the most fruitful in the epistemology of modern times." We agree with him, and feel that every treatment of either the logic or the psychology of cognition should proceed along these two lines. Professor Baldwin has surveyed and mapped a region which should now be settled by the logician

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LOGIC AND IMAGE.

On Material Representations of Deductive Processes. Giovanni Vailati. Journal of Philos., Psychol., and Sci. Meth., 1908, V., 309–316.

This is a contribution to the problem which confronts all who endeavor to explain mental attitudes and operations. Such explanations must, in the nature of language, be made in physical terms and represented by metaphors of a physical character. The author enters this almost unexplored field of research, and quite thoroughly investigates the uses of metaphors in the description of that important phase of mind action employed in the use of deduction.

There are two ways to undertake such a study: Either take a given metaphor used to represent mind activity and see what mind operations pass through such metaphor; or take a mind action and see what the different images are by which it is represented. The author chooses the latter method and takes deduction, making a study of the metaphors used from time to time in describing and explaining the process.

The various types of images used to describe the fact that one affirmation may be deduced from another are three. First, recourse is had to the terms 'supporting' and 'upholding,' as for instance, the conclusion is said to be 'based' upon, or 'founded' on, given premises.

We speak in similar terms when we say the 'basis' of morals or the 'foundation' of geometry. Secondly, metaphors of 'ascending' or 'descending' are used signifying to 'flow' from or being 'retraced' through. We speak of a fact 'flowing' from other facts. Or we say a proposition is 'traceable' to certain premises. 'Spring' from, 'emanate' from, 'drawn' from are other metaphors of similar signification. Thirdly, the conclusion is often said to be 'included' in the premises, 'contained' in them, etc. We often speak of this relation when we say the premises imply the conclusion. Sometimes, as in case of mere explanation, the conclusion is contained in the premises.

Each of these three general types is taken up and the errors into which their careless use has led are pointed out. The first, the 'founded-upon' idea, leads us to this objection to the 'surety' of the conclusion arrived at deductively: being always 'founded' upon a previous fact, we finally in the regress come, of necessity, to the first fact, which is not verified by deduction. So deduction, instead of being a process of arriving at 'sure' conclusions merely increases the number of assertions which participate in the certainty which, independently of any deductive process, '*some* of our *beliefs* already possess.' So deduction is not a means of *producing* certainties but of *distributing* them. A deducer is a retail dealer or jobber in the commodity of certainties, not a producer of such commodity.

The article takes up both of the other general types of metaphorical uses in representation and analyzes and applies them in a manner similar to the above, shows how they fall short, and often how they lead into error. Space, in this summary, forbids full development of them.

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DEVELOPMENT AND HEREDITY.

The Problem of Age, Growth and Death. A Study of Cytomorphosis. CHARLES S. MINOT. New York and London, 1908. Pp. 280.

Heredity. J. ARTHUR THOMSON. New York and London, 1908. Pp. 603.

Two recent biological volumes of Putnam's *Science Series* are of much general interest. Minot's *Age, Growth and Death* discusses that question of acutely personal interest to each of us: Why do organisms grow old and die? The author's investigations have long been directed to the processes of growth and senescence, and no one

is better prepared than he to deal with the subject. Minot's view is that age and death are a secondary result of that specialization of the cells which is so necessary for full and effective life. We may put the theory in physiological rather than histological garb as follows: The young undifferentiated cell carries on properly all the functions necessary for its own life, — metabolism, growth, reproduction, etc. But as it takes on the special functions required by its place in the organism, becoming muscle, gland or blood corpuscle and differentiating correspondingly, it becomes one-sided. Changes that aid it in carrying out the special bodily functions entrusted to it are a hindrance to those functions which make up its own cellular life. These cellular functions therefore finally weaken and cease; the cell becomes inactive and dies. As this happens in most of the cells of the body, the latter must likewise weaken and die. Thus the welfare of the individual cell is sacrificed to that of the body as a whole, and this in turn involves the final destruction of the body itself. A period of higher, diversified life is purchased at the price of ultimate death.

This differentiation of the cell is called by Minot cytomorphosis. The theory, original with Minot, that it is the fundamental cause of age and death is perhaps now rather generally accepted. Most other theories of the matter seem to reduce, on analysis, to some form of this one.

In his interesting detailed working out of the cytomorphic process, Minot comes to certain paradoxical results, which will doubtless not command throughout such general assent as his main thesis. Cellular differentiation affects the cytoplasm rather than the nucleus, the first step being an increase in the proportional amount of cytoplasm. This cytoplasmic increase is held therefore to be one of the first and fundamental phenomena of senescence. It begins after the egg has divided into a few cells; therefore senescence is held to begin at that time. Again, age is partly characterized by cessation of growth. We find that, relative to the existing weight, growth takes place most rapidly in the very earliest stages of development, decreasing in relative rate rapidly from the very beginning. The rate of decrease becomes less and less, till in age there is hardly any decrease. Hence "we begin with a period of extremely rapid decline, and then end life with a decline that is very slow and very slight." Such ideas recur frequently in the book. To understand them it is evident that we must attach no other idea to 'decline' than *decrease in relative rate of growth.* The commoner idea of the decline during senescence is the decrease in power and effectiveness which begins after strength has culminated through a long period of development. This long development leading up to the culmina-

tion is, according to Minot's criterion, one long period of continual decline. The justification of so paradoxical a view is of course to be found in holding that the decline in growth and the later decline in effectiveness are merely different phases of a single process. But the two are evidently not identical, since effectiveness first increases, then stands still, then decreases, while rate of growth decreases throughout. Possibly Minot would have made his theory clearer without essentially changing it if he had emphasized less the criteria of rate of growth and quantity of cytoplasm.

Thomson's *Heredity* on the whole fulfils its author's aim of providing an exposition of the subject that is 'comprehensive and accurate without being exhaustive and mathematical.' In this case the author is *not* an investigator of the subject dealt with. This frees him from polemical tendencies, and gives him breadth of view rather than profundity or suggestiveness for further work. The book treats not merely the physiology of genetics, but deals with heredity from all standpoints — physiological, mathematical, medical, practical, sociological. The style is attractive; the book is one for the general reader as well as for the special student. It is beyond doubt the best general exposition of the subject that we now have.

The standpoint is that of a thoroughgoing Weismannian who finds it a little difficult to graft the recent experimental Mendelism on the Weismannian stock, but makes a valorous attempt to do so. Experimental workers will probably feel that the author overestimates the value of the results of the mathematical treatment of the matter. While the exposition of the experimental facts of Mendelism is in general excellent, in the sociological application (perilous ground!) the author drops into one of the deceptive pitfalls of Mendelian theory. The case is worth noting, for this particular pit is one that yawns for the unwary, and many there be that fall therein. On page 525 it is suggested that halfbreed stock of mixed European and Asiatic parentage should in later generations break up into pure Europeans and pure Asiatics. "As we have seen, the inbreeding of *hybrids* of peas, stocks, mice, etc., is followed by a splitting of the offspring into true-breeding types like the two parents of the hybrids. We may suggest that a careful inquiry should be made as to the results of intermarriage among Eurasians, for if Mendel's law holds there should be a sifting out of pure Asiatics and pure Europeans, both probably more desirable than Eurasians, fine mentally and physically as the latter often are."

In this passage the author has allowed himself to be misled by the

deceptive Mendelian phrase 'purity of the germ cells,' while forgetting that other cardinal point of Mendelism, the *independence* of the different characters in their later distribution. The later generations become pure (so far as they become pure at all) only with respect to particular parental characters taken separately. There might result an individual that was pure European so far as eye *color* was concerned, but equally pure Asiatic so far as *position* of the eyes (oblique, for example) was concerned; and similarly of all other characteristics, physical and mental. But Mendelism gives no ground for expecting a race pure in all characters to be produced; in view of the thousands of independent characters concerned, the chances are practically infinite against that result ever occurring, once the mixture has taken place. The author reasons as if 'European-ness' and 'Asiatic-ness' were a single pair of alternative characters, when in fact each involves thousands of independent pairs. But such slips are rare; the book is on the whole sound.

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The Idea of Development and its Application to History. George Galloway. Mind, 1907, XVI., 506–534.

After pointing out the careless use of the word development by scientific writers in general, Mr. Galloway says that it must be employed with great qualification in the region of human culture.

Aristotle was the first to formulate the idea of development, but he never seemed to have considered history in the light of his theory. The idea of history was of a cycle and not a progressive movement toward some far off good; this latter idea is directly due to Christianity. Leibnitz was the first to treat the idea of development in modern philosophy, in his theory 'of a continuous time process, teleologically not mechanically determined.' Kant keeps the idea of development in the background, while Lessing was the first to apply Leibnitz's idea in the historic sphere. Herder first treated historic phenomena comprehensively from this point of view and boldly extended the idea from the organic to the spiritual world. Hegel, however, was the most profound writer on the subject of development; for by it he meant the unfolding of what has already potential existence, the cause and end of which are therefore determined. Spencer, Comte, and J. S. Mill all advanced the idea that the important thing in development is the presence of causal connection between the parts and the evidence of the reign of uniformity. In both the philosophy of Hegel

and Mill, therefore, we find the principle of continuity. There are presuppositions involved in the idea of development as illustrated by the growth of organisms; there is the germ, the continuous process in the germ in virtue of which it assumes successive phases, and an end which is set over against the beginning. It is also assumed that the end is that for which the beginning was. The failure of the ordinary causal view is partly due to the fact that it overlooks the idea of progress in time and thus makes way for the teleological view.

Our subjective experience gives us the notion of end. Our sense of voluntary effort embodies itself in our representation of end as something to be achieved. Can we interpret historic progress as an organic development? At the outset we meet the distinction between organic and spiritual or historic development. In the organic we may say it represents what is to be; in historic or spiritual what ought to be. One deals with connected facts: the other with related values. If we take the nation as a unit we find it impossible to apply the rule that the whole moves all together if it moves at all, and the phenomena are too varied to be interpreted on the analogy of organic growth. A particular phase of culture is only an element in the self-conscious life of an individual; therefore, the key to the meaning of historic development is not to be found in a generalized conception of the process as a whole, but in the psychical life of the individuals themselves. Self-conscious minds are the living centers, and psychical events are the real kernels of history. As cause and effect are not found in mental processes, psychical developments must be interpreted as purposive processes which take form in a continuous acquisition of meanings; therefore facts are more than facts; they are values. And here Professor Wundt is quoted to the effect that proximate ends control psychic consciousness, and that man neither knows nor concerns himself with the remote issues of his choice; and Professor Villa is quoted to the same effect. This would tend to make history non-rational.

Mr. Galloway disagrees, however, with this conclusion and says that this view does not properly conceive the teleological aspect of history; for feeling unqualified by a purpose resembles instinct, and instinct does not minister to progress. The distant ends, while less pressing, are always in view. Evolution in the form of an unfolding of an idea strictly fixed in all its stages cannot be shown on the evidence to apply to historical development; but there is a continuity of some kind; and the conclusion is that the process of historical development has within it a certain flexibility, but this flexibility is within the limita-

tions prescribed by the principle of continuity, and hence, the process is never absolutely broken or disconnected. We cannot say, however, that there is continuity in history, but only that the movement is continuous in the direction of progress; for such facts as decadence and disintegration of nations have their place. The question as to whether development is present in history or not, depends largely on the point of view. History is the battle field of values and the ideal takes new forms with the changing life of humanity. The question may be asked, is it possible to describe the process of a development in the sense of a movement from the less to the greater value? In the light of the ultimate value we judge that the movement discloses an increase of value in the line of end or final goal. The objection is that no value which is in process can, in the nature of the case, be final. We would have to define the absolute value in terms of the stage in which it is realized, and this could only be appreciated by reference to the absolute value. Neither the idea of a perfect final state in time, nor that of endless progress in time, satisfies the demands of a consistent theory; hence, to think out the implication of the notion of development as applied to history would bring us into the region of metaphysics. The great difficulty lies with the time idea; for the historic process loses its meaning if time is to be declared unreal. To interpret time as either real or unreal seems untenable; for the first empties history of value, and the second precludes any way of relating the process to its goal. Our present time ideas are not adequate to the goal of history.

The outcome of the argument is, that while our reading of history in terms of our time idea is not illusory, yet when we try to give a satisfying meaning and end to the process in terms of this idea, the statement is inadequate, and we cannot find any meaning in history viewed as a mundane process which will satisfy reason; therefore the meaning transcends the present temporal order. Mr. Galloway assumes, however, that the process is not meaningless; we therefore make the postulate that the solution of the contradiction lies in the transcendent sphere. If there be no continuity between the temporal and eternal values, however, the postulate fails to justify itself. By insisting on the inner relation of each personal life to the Eternal, it seems possible to do justice to personal values, and it may well be that what we term an eternal state of being means simply the deliverance from our present time span, and is not incompatible with change and activity.

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The Hearing of Primitive Peoples. F. G. BRUNER, Ph.D. Archives of Psychology, No. 11, July, 1908. Pp. 113.

In this monograph are presented the results of an interesting investigation to compare the hearing of several races in respect to two problems, namely, the upper threshold of pitch and simple acuity to sound. The investigation was made at the Louisiana Purchase Exposition in 1904. Nearly four hundred individuals were tested who were distributed among different races as follows: 156 Whites, 63 Indians from the Government School, 137 Filipinos, 10 Cocopa Indians, 7 Ainu, 7 Vancouver Indians, 6 African Pigmies, and 4 Patagonian Indians.

Part I. deals with the upper pitch limit. A critical survey of previous researches on this topic is first presented. The tests were made by means of the Edelmann form of the Galton Whistle. The measurement on a given individual consisted in proceeding from an audible tone by gradual increments in pitch to an inaudible tone and back again to the audible region. The average of the last audible tone in the former, and of the first audible tone in the latter procedure was considered the threshold. The two ears were tested separately. Most of the experiments were made in a specially constructed booth.

The averages thus found for the three largest groups of peoples are: For the right ear, Whites 32,285 D.V., Indians 31,975, Filipinos 29,916; for the left ear, Whites 33,087, Indians 31,580, Filipinos 29,886. The Whites thus have the highest pitch limit. All the smaller groups were found to be inferior to the Whites with the exception of the six Pigmies, who had a higher threshold. The lowest place is assigned to the Vancouver Indians.

Some further results, obtained from 385 Whites ranging from 5 to 65 years, are given to show the relation between age and upper pitch limit. The figures indicate that the upper threshold remains practically constant up to the sixteenth year, after which there is a gradual lowering during the next thirty years amounting to almost an octave.

Part II., dealing with auditory acuity, is also introduced by a critical, historical résumé. The stimulus consisted of a telephone click whose intensity was varied by a sliding induction coil. The measurements were made according to the method of minimal change proceeding from audible to inaudible sounds.

The results are tabulated in terms of the condensation of the sound wave leaving the instrument and also in terms of the energy in ergs. The Whites were found to have the most acute hearing and the Filipinos the least acute. The three largest groups rank, in terms of

condensation, as follows: Right ear, Whites 5.6, Indians (school) 7.5, Filippinos 24.2; left ear, 7.2, 8.5 and 26.6 respectively. The Indians in attendance at the schools have better acuity than those in their natural habitats. No explanation is given for the inferior acuity of the Filipinos.

This monograph is valuable for the critical survey of previous investigations on the two problems studied and for the comparative data of the different races. The results of the three large groups (Whites, Indians, Filipinos) can be accepted with considerable confidence. Too few representatives of the other peoples were available to make the results final.

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PSYCHOLOGY OF READING.

The Psychology and Pedagogy of Reading, with a Review of the History of Reading and Writing and of Methods, Texts, and Hygiene in Reading. EDMUND BURKE HUEY. New York, Macmillan, 1908. Pp. xvi + 469.

There is special delight in welcoming such a book as Professor Huey has here given us. He has provided the most readable English work on the reading habit, which 'has become the most striking and important artificial activity to which the human race has ever been moulded.' He has worked in its preparation with a two-edged sword, clevaing his way frankly and heartily through many of the mazes of special psychological experimentation and of book-making and school-room practice.

It is extremely difficult to summarize such a volume as this. It has drawn from so many sources in quest of information and suggestion upon the central theme of the conditions and processes of reading both as a racial and an individual experience that the volume must remain its own best digest. The limits of the work are properly recognized by the author, who admits that "no two authors would select the same material for such a work upon reading. I have endeavored to present the most meaningful facts, and those researches in which more or less definite results have been reached. Completeness of treatment and of reference is out of the question in a subject having such various and intricate ramifications" (p. x). The program of twenty-two chapters is startling enough. But the author has saved confusion by a more or less appropriate grouping of the successive chapters under special headings. After the introductory chapter, which calls

attention to the world-wide function and work-a-day demands of reading, Part I. includes eight chapters which treat of 'The psychology of reading.' Part II. comprises four chapters which sketch 'The history of reading and reading methods.' 'The pedagogy of reading,' in six chapters, is the topic of Part III. Part IV., on 'The hygiene of reading,' is made up of only two chapters; and the book closes with a chapter on the future of reading and printing.

The longest portion of the book, Part I., presents a description and analysis of the reading process itself so far as this is known through the results of the rather recent experimental investigations. That most of this work has been undertaken during the past dozen years (p. 16) is a good indication of either the demand that psychological methods should be applied to so-called practical problems, or the failure of science to come quickly to terms with happenings that seem most familiar. In this part of the work the author is probably at his best. He has judiciously selected results appropriate to his theme and the limits of his space, the chief topics being the work of the eye, the amount grasped during a reading pause, the nature of the perceptual process in reading, the nature and function of inner speech, the seizure of meaning, and the speed of reading. The technique and results of his own experimental investigations are mingled critically and appreciatively with the findings of no less than twenty researchers, such as Cattell, Dearborn, Delabarre, Dodge and Erdmann, Holt, Goldscheider and Müller, Lamansky, Landolt, Messmer, Quantz, Woodworth, and the opinions of such authorities as James, Stout and Wundt. The facts discovered and views entertained by these special students of reading are fittingly given in detail, inasmuch as there is peculiar difficulty in presenting final conclusions as to the intimate nature of the mental and physical processes involved. The burden of this work is thus transferred to the reader's own conclusions as the data for views are made to pass before him. It is noticeable that the author has made no use of the studies on eye movements issuing from the Yale psychological laboratory since 1905.

Part I. deals with the processes of reading as organized by adults to-day. Part II. goes to the other extreme in time and exhibits the more objective conditions of reading by taking one back to the beginning of the writing process as traceable in the primitive records of the race. The story of the growth of writing, the alphabet, and the evolution of the modern book is interestingly retold, following such authorities as Clodd, Deniker, Taylor and Tylor. The motif of this section is genetic; but the immediate purport of this historical treatment

however inviting and interesting in and of itself, is not strikingly apparent.

An extended and critical review of the material, methods, and other practical problems of teaching reading is presented in Part III. Following the description of the alphabet, phonic, phonetic, word, sentence, and combination methods of learning to read, the discussion goes into details concerning the good features, the difficulties, and the defects of the various 'systems' of teaching to read now in vogue. The treatment is made interesting by the introduction of passages, pages, and illustrations from the primers and readers mentioned. Of the more than one hundred texts, manuals, and specific systems of teaching reading examined (p. 276), about fifteen representative specimens are treated in detail. The scope of this examination, as well as the record of practices followed by schools and the compilation of the 'best thought' on teaching reading, is limited almost entirely to American texts, schools and educational leaders. The first appearance of 'rules' for learning to read occurs in chapter sixteen. These rules are finally summarized by thirteen practical pedagogical conclusions (pp. 379 ff.).

In the remaining portion of the work one finds a good, brief summary of the hygienic aspects of the reading functions, and an insistence on the objective conditions of type, paper, and printing which are most favorable for the reading, performance. One need not be surprised if it takes more than the mere discoveries in reading hygiene to overcome the vested conservatism of printers and publishers.

In a scientific journal such as this, attention should be called to one particular trait of this work. Probably its most striking feature is the tempered, yet progressive mixture of science and practice. Indeed, the author is fully aware of the limitations of our scientific knowledge of the reading processes and their growth, and he has accomplished with unusual success the rare task of writing a book which can appeal to the scientist, the teacher, and the general reader. Another most helpful feature is the impulse the author seeks to put into the experimental attack upon these problems, not only by the dedication to his 'Fellows in Research,' but by the controlling aim of the whole summary, which is 'not to close the story, but to furnish a new point of departure for further study, and to give perspective for new researches.' That the age of experimentation is still with us can be shown by no finer exhibition in our psychological and educational literature of a spirit of helpfulness in removing the ancient landmarks of dogmatism both in science and in daily practice.

The progress of the discussion is marred not a little by the lack of unity in the bearing placed upon psychology in the several parts. The genetic psychology necessarily creeping in in Part III. (*e. g.*, Chapters XVII. and XIX.) is not provided for in the experimental point of view in Part I. The results gathered in the earlier analyses of the reading process are but meagerly employed as criteria in the discussion of methods of teaching reading. On the other hand, the psychology of dominant genetic interests as typified in the early years and in adolescence, but not foreshadowed in the first part, come in for a good share of guidance in the question of practical applications.

There is a persistent error in referring to the title of Stout's treatise on 'Analytical Psychology.' A selected bibliography of twelve pages is added, and an exhaustive index increases the usefulness of the book.

E. F. Buchner.

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Ueber die Erkennbarkeit geometrischer Figuren und Schriftzeichen im indirekten Sehen. A. Kirschmann. Archiv f. d. ges. Psychologie, 1908, XIII., 352–388.

Different geometrical forms of equal area were used in campimeter measurements. The results show that acute-angled figures are more readily recognized than obtuse-angled; that, aside from the difference between the nasal and temporal sides of the retina, both eyes are more efficient for objects on the right side than on the left in the visual field; and that white figures on a black back-ground are more readily perceived than black figures on a white back-ground in the indirect field.

Experimenting with capital letters, the following order was established as the order of legibility:

— AWI — LVXFYEZJTKDUSPBMRN — OHGQC. —

This tends to show that, other things being equal, acute-angled letters are the best and rounded letters the poorest. The law of light and dark figures was also substantiated for letters.

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DISCUSSION.

IS TASTE A SPATIAL SENSE?

Taste is usually not regarded a spatial sense, because the spatial localizations which we make of tastes on the tongue are usually couched in terms of touch. The taste stimulus is of such a nature that it cannot be applied without involving touch, no matter how etherial. A crucial experiment may, however, be arranged in the following manner:

Take two pipettes each holding a drop of liquid at normal temperature and of practically the same consistency except that one is only distilled water and the other contains some tastable substance. Such taste substance must be chosen as will not alter the consistency in any way that can be perceived through touch. Now let these two drops fall strictly simultaneously upon symmetrical parts of the tongue so as to be fifteen mm. apart, and require the observer to state which drop contains the taste. For a moderately sweet taste, with the drops applied 30 mm. back from the tip of the tongue, 15 mm. apart, a good observer will invariably be able to tell which drop contains the taste, or if each drop contains a different taste, he will be able to refer each to its proper position. Preliminary experiments show that this taste discrimination is very fine. On the sensitive part of the tongue, the tastable substance would be located accurately even when the two drops are as close together as they may well be without fusing.

This is an exceedingly simple procedure and yet it seems to be a crucial test and settles once for all the fact that taste is a spatial sense. I publish this preliminary note to invite criticism, because the procedure is so simple and the conclusion is so far reaching.

Granted that taste in itself is a refined spatial sense, certain problems present themselves at once, such as: Is it actually of service now? To what extent do we possess pure taste imagery of location? Do the anatomical structures justify our conclusion? What has been the history of the evolution of taste with reference to space-sensing organs? What is the biological significance?

This procedure may, undoubtedly, be adapted also for a crucial test of the spatial character of other lower senses, particularly temperature and pain.

C. E. SEASHORE.

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BOOKS RECEIVED FROM MARCH 5 TO APRIL 5.

A Text-book of Experimental Psychology. CHARLES S. MYERS. New York, Longmans, Green; London, Edward Arnold, 1909. Pp. xvi + 432.

The Psychology of Skill, with Special Reference to its Acquisition in Typewriting. WILLIAM FREDERICK BOOK. (Univ. of Montana Publ. in Psychology, Vol. I.) Missoula, University Press, 1908. Pp. 188.

NOTES AND NEWS.

AT Stanford University Henry W. Stuart has been promoted to the rank of professor of philosophy, and Lillie J. Martin to the rank of associate professor of psychology.

WE record with regret the death of Dr. Hermann Ebbinghaus, professor of philosophy at the University of Halle, and editor in chief of the *Zeitschrift für Psychologie und Physiologie der Sinnesorgane.*

THE Association of Teachers of Psychology in the Colleges and Normal Schools of the North Central States met at the University of Chicago on April 3.

THE March number of the BULLETIN, on Child and Educational Psychology, was prepared under the editorial care of Professor M. V. O'Shea. The usual acknowledgment was inadvertently omitted.

The following are taken from the press:

DR. R. S. WOODWORTH has been promoted to a professorship of psychology at Columbia University; Mr. H. H. Woodrow has been appointed tutor in psychology at Barnard College.

PROFESSORS MORTON PRINCE and George V. N. Dearborn offer at the Tufts College Medical School a course on psychopathology, which is required for fourth year students of medicine; it is said to be the first of its kind.

THE two Italian journals, *Rivista filosofica* and *Rivista di filosofia e scienza affini*, have been merged; the title of the new journal will be the *Rivista di filosofia.*

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THE

PSYCHOLOGICAL BULLETIN

THE OBSERVER AS REPORTER: A SURVEY OF THE 'PSYCHOLOGY OF TESTIMONY.'[1]

BY DR. GUY MONTROSE WHIPPLE,

Cornell University.

To the individual who, in psychological experimentation, submits himself to a given experience and renders us an account of it, we apply the name *observer*. The observer's account will commonly assume linguistic form. Although language is in the main a flexible, delicate, accurate, and easy means of communicating ideas, yet the observer's account can never do justice to the continuity, complexity, and delicacy of shading of his mental experience, however much we refine our terminology and train our observer. And all too often we fail to realize the inadequacy of verbal expression to the experience which is being described. We fail to keep in mind that the observer not only observes, but that he also reports, and that it is not only possible, but practically certain, that the report is only a partial and often a misleading statement of the real experience.

If, then, the work of reporting is difficult even for the trained expert working under laboratory conditions and using a carefully refined terminology, how much more difficult must it be for the untrained individual to report with accuracy and completeness the experiences of his daily life, when to the inadequacy of his language there must be added the falsifying influences of misdirected attention, mal-observation, and errors of memory, not to mention the falsifying influences that may spring from lack of caution, of zeal for accurate statement, or even from deliberate intent to mislead.

The idea that the capacity for report should itself be a subject for

[1] This paper was presented in condensed form before the American Psychological Association, at Baltimore, Md., December 31, 1908.

special experimental investigation seems first to have been definitely proposed by Binet in his book *La Suggestibilité* (1900), in which he calls attention to 'the advantage that would accrue from the creation of a practical science of testimony,' and expresses his conviction that this science is too important by far for its organization to be long delayed.[1]

While Binet's suggestion sprang from the fruits of psychological investigation, it is to be noted that it was directed toward the practical ends to be attained, particularly in jurisprudence. From this practical point of view has arisen also the interest in the psychology of testimony of certain jurists, notably Professor Hans Gross, of Prague,[2] who has done pioneer work in this field.

The psychology of report has found its most enthusiastic and active expositor in Stern, of Breslau, whose *Zur Psychologie der Aussage: experimentelle Untersuchungen über Erinnerungstreue*[3] was the direct stimulus to the appearance of numerous other contributions and in whose periodicals[4] practically all of these and subsequent contributions have, directly or indirectly, appeared. The fact that English and American investigators are conspicuous by their absence may be sufficient excuse for the present paper, which aims not to present anything new in this field, but to stimulate interest in the problems under discussion.

Problems.

The first problem of the psychology of report is in essence this: given a person who has had a certain experience, to study his report of that experience, and especially to analyze all the factors that may condition the fulness and accuracy of the report. When this 'appreciation' of testimony has been secured, there appears a second main problem, viz., the construction of a normative science of report, *i. e.*, the determination of rules for the evaluation of reports given under any specified conditions,[5] and the recommendation of methods for training

[1] Work that might now be classed as psychology of the report had, of course, been done prior to this time, *e. g.*, Binet's and Miss Bryant's description-tests and many phases of the experimental investigation of observation, tachistoscopy, and memory.

[2] Author of *Kriminalpsychologie*, 1st edition, 1897, and o a *Handbuch für Untersuchungsrichter*, and editor of the *Archiv f. Kriminalanthropologie.*

[3] In the *Zeits. f. d. ges. Strafrechtswissenschaft*, 1902, also published separately, Berlin, 1902.

[4] *Beiträge zur Psychologie der Aussage*, 1903–7, enlarged in 1907 into the *Zeits. f. angewandte Psychologie.*

[5] It has been shown already that the scientific study of testimony can suggest important modifications in legal procedure: methods can be prescribed for the

in fidelity of observation and report. The numerous specific problems which are embraced in the main problems just mentioned relate to such issues as the dependence of the report upon the age, sex, mental ability, etc., of the reporter, the effect of bias, prejudice, of his familiarity or unfamiliarity with the occurrence under description, of the form of report, of the time that has elapsed since the event, etc. The more important of these special problems are discussed in the following sections.

Methods.

There are in general two methods of studying report: first, what might be termed the historical method (Larguier's method of observation, Stern's casuistical method); second, the experimental method.

The historical method consists in the critical examination of typical instances of report as found in various records, particularly in history and jurisprudence, *e. g.*, an analysis of the conflicting accounts of an historic battle, of the testimony of witnesses in criminal trials, of the work of newspaper reporters, etc. This method is less promising than the second, and I forbear to consider it further.

The experimental method possesses the obvious advantages of standardization of conditions, control of the determining factors, possibility of repetition and of quantitative and statistical evaluation of the results. But the method has been criticized, particularly by jurists, on the ground of over-simplification, general artificiality and consequent non-applicability to the problems of real life — criticism which is, I think, entirely intelligible, however incorrect.[1]

Within the experimental method, there are a number of specific methodological problems to which I now direct attention.

1. *The Choice of Material.* — The prime requisite here is the selection of material that shall admit of exact and detailed comparison with the report. This requisite has been a chief factor in the choice of the *picture-test*[2] — a test which has the additional merit of being inexpensive, easily procured, easily administered, readily duplicated

avoidance of unfavorable conditions in the taking of testimony: possibly in time there may be developed a satisfactory series of diagnostic tests for estimating the reliability of witnesses, or there may appear psychological experts whose opinions may be sought in consultation.

[1] There are signs, especially in Germany, of a better appreciation by the jurists of the work of the laboratory experts: so far as I know the epithet 'yellow psychologist' has not been applied as yet to any German investigator, as it has been to a well-known psychologist in this country.

[2] As in the work of Binet, Stern, Wreschner, Lobsien, Borst, Minnemann, de Placzek and others. The geometrical figures and drawings of objects used by Lobsien, Minnemann and others might be included here.

and repeated, of affording experiences of varied types and varied complexity, and of providing a situation not wholly unlike that of everyday life. The test has been criticized, *e. g.*, by Gross and by Jaffa, as artificial and too unlike the type of situations with which legal testimony has to deal, but this criticism has more theoretical than practical validity, because experiment has shown that the inferences drawn from the picture-test have, as a matter of fact, the general validity that is claimed for them.

This criticism has also been met by the actual use of *event-tests* in which opportunity is supplied for report upon human activities under realistic conditions. A typical illustration is afforded in the prearranged fictitious, but carefully enacted attempt at murder in the seminary of V. Liszt at Berlin.[1]

The *rumor-test* is arranged to compare hear-say evidence with the reports of eye-witnesses.

Other forms of material have had less extended use, *e. g.*, the description of known objects from memory (Stern, Lipmann, Gross), the reproduction of texts read aloud (Binet and Henri, Stern, Minnemann, de Placzek), the estimation of time-intervals and spatial dimensions, present or past (Stern), or the report of simple acts performed by the experimenter before the observers (Gross, Münsterberg).

2. *The Choice of Exposure-time.* — For events or texts, the duration of the original experience is obviously self-regulated: for pictures, times ranging from 5 sec. to 7 min. have been employed, though 45 to 60 sec. is most usual. It is to be desired that experiments, analogous to those on memory, should be undertaken to determine more carefully the effect upon the report of different exposure-periods. At present we know little about optimal exposure: in practice the time may be determined most satisfactorily by preliminary tests which show how long a period is necessary to permit an average person to examine each detail of the picture once.

3. *The Choice of Time-interval.* — Between experience and report any desired time may elapse: tests have been made for intervals of from nothing to nine and a half weeks. Here again is an inviting field for study of the effect of time-interval upon fulness and fidelity of report: investigations heretofore have been unfortunately complicated by the introduction of one or more reports during the interval.

4. *The Choice of Form of Report.* — There are two distinct

[1] Less elaborate event-tests have been made by Lipmann, Minnemann, Stern, Weber, and de Placzek. Lobsien took his pupils to witness an act of Minna von Barnhelm ; Stern has suggested the use of the moving-picture show in this connection.

forms of report, (1) the 'narrative'[1] (*Bericht, récit*), (2) the 'interrogatory' (*Verhör* of Stern, *Prüfung* of Wreschner, *interrogatoire* of Borst, *forçage de mémoire* of Binet). The narrative is a free account, delivered by the reporter, either orally or in writing, without comment, question, or suggestion by the experimenter: the interrogatory is a series of prearranged questions: the replies to these questions constitute the 'deposition' (*Verhörsprodukt*).[2] The constituent parts of narrative and deposition may be termed 'statements' or 'items.'

These two forms of report are psychologically dissimilar. The narrative has the advantage of freedom from suggestion, of spontaneity and individuality; but it has, as Wreschner has shown, the disadvantage of difficulty in precise statistical treatment, since the omission of a given item is equivocal (because we cannot tell why the reporter failed to mention it). If, however, as is the custom of nearly every experimenter at present, we supplement narrative by interrogatory, we gain the advantages and avoid the disadvantages of both forms of report.

5. *The Choice of Form of Interrogatory.* — An 'incomplete' interrogatory contains questions that refer only to those items not mentioned by the reporter in his narrative: a 'complete' interrogatory contains an exhaustive series of questions that cover every feature of the experience and that are propounded to all reporters in the same order and manner, — save for such minor modifications as individual replies most occasionally demand.[3] The number of questions for a single test ranges from 15 to 100; commonly about 50 are employed.

6. *The Choice of Questions.* — Since the form of questioning may materially influence the reporter's deposition, it happens that, in the study of testimony by the interrogatory, the interrogatory itself has become an object of study, with special reference, naturally, to the effect of leading or suggestive questions.

[1] It has been necessary for me to construct an English terminology for the *Aussage* psychology, since its technique has been developed in Germany and France and has never been carried over into equivalent English, so far as I am aware. An inspection of the foreign terms in use will show that they have not been selected with particular care. In selecting English equivalents, especially for the coefficents of report, I have tried to avoid conflict with established legal usage and at the same time to produce a terminology that shall be both consistent and descriptive. The French or German equivalents have been indicated for all the important terms.

[2] This is not in strict accord with legal usage, since a deposition might be in narrative form, yet, as distinguished from an affidavit, a deposition implies testimony that is made under interrogation and subject to cross-examination, and in this sense the term may be employed to indicate the result of the interrogatory.

[3] For this reason the best results are secured by individual examination with oral questions and answers, and stenographic record of every reply.

Stern has proposed a classification of questions, which, though perhaps only approximate, may serve to illustrate the importance of care in framing the interrogatory. He distinguishes six types of questions, viz., determinative, completely disjunctive, incompletely disjunctive, expectative, implicative, and consecutive. In illustration, suppose that the stimulus was a picture in which there was a dog, but no cat: on this basis, examples of the six types might be framed as follows:

A *determinative* question is one that is introduced by a pronoun or interrogative adverb, and is the least suggestive form of question, *e. g.*, "What color is the dog?"

A *completely disjunctive* question is one that forces the reporter to choose between two specified alternatives, *e. g.*, "Is there a dog in the picture?"

An *incompletely disjunctive* question is one that offers the reporter a choice between two alternatives, but does not entirely preclude a third possibility, *e. g.*, "Is the dog white or black?" In practice, for many reporters, especially for children, this form is virtually completely disjunctive, since a certain amount of independence is demanded for the choice of the third possibility, *e. g.*, for the answer "The dog is brown."

An *expectative* question is one that arouses a moderately strong suggestion of the answer, *e. g.*, "Was there not a dog in the picture?" (This is the form used by Binet to induce moderate suggestion.)

An *implicative* question is one that assumes or at least implies the presence of a feature that was not really present in the experience, *e. g.*, "What color is the cat?" In practice, it is clear that a determinative question might become implicative if the reporter had completely forgotten the item to which it referred. (The implicative question was used by Binet to induce strong suggestion.)

The *consecutive* question is any form of question that is used to augment a suggestion that has been developed by previous questions.

7. *The Choice of the Method of Grading Reports.* — In securing numerical expression of the adequacy of reports the chief problem is: what is the best method of translating the degree of correspondence between experience and report into quantitative terms? A second problem is: what attributes of the reporter's work are important enough to be symbolized as indices or coefficients of report?

In general, the adequacy of a report depends both upon its quantity and its quality: quantity is measured by the number of items mentioned or the number of questions answered (in absolute or in relative terms) and is referred to as the range of report (*Umfang*, *étendue*): quality is measured by the fidelity of the statements made, and is referred to as the accuracy of report (*Treue*, *fidélité*).[1]

For statistical work, attention must also be given to the degree of assurance or the positiveness or certainty with which the reporter makes his replies. Experience has shown that it is feasible and psycho-

[1] Accuracy seems, on the whole, a more feasible term than fidelity or exactitude, though fidelity has the advantage of subjective reference.

logically justifiable to differentiate, beside complete uncertainty (as indicated by the answer "I don't know" or "I have forgotten"), three degrees of assurance, viz., (1) hesitancy ("I think" or "I believe"), (2) certainty or assurance of ordinary degree, *i. e.*, positive assertion, and (3) attestation or attestable assurance, *i. e.*, the highest degree of assurance, as indicated by the willingness of the reporter to take his oath that the statement is correct.[1]

The computation of the several coefficients of report may now be based upon these values in accordance with a number of simple formulas.

COEFFICIENTS OF REPORT.

Let
P = number of possible items,
n = number of items reported (or replies made),
c = number of items reported with certainty (including attestation),
a = number of items whose correctness is attested under oath,
$n(N)$ = number of items reported in the narrative,
$n(D)$ = number of items reported in the deposition,
$n(r)$ = number of items that are rightly reported,
$c(r)$ = number of items that are certain and right,
$a(r)$ = number of items that are attested and right,
$a(w)$ = number of items that are attested and wrong,

Then
(1) n = range of report, absolute (*Umfang*, *étendue*),
(2) n/P = range of report, relative,
(3) $n(N)/n(D)$ = spontaneity of report,
(4) $n(r)/n$ = range of knowledge (*Umfang des Wissens*, *étendue du savoir*),
(5) $n(r)/c$ = accuracy of report (*Treue*, *fidélité*),
(6) c/n = assurance (*subjective Sicherheit*, *assurance*),
(7) $r)/c$ = reliability of assurance (*Zuverlässigkeit der Sicherheit*, *Sicherheitsberechtigung*, *fidélité de la certitude*),
(8) $c(r)/n$ = warranted assurance (*Sicherheit der Person*, *assurance justifiée*),
(9) $c(r)/n(r)$ = accuracy of assurance (*justesse certifiée*),

[1] In practice, sworn statements are commonly recorded by asking the reporter to underline the portions of his testimony to the correctness of which he would be willing to swear if under oath.

(10) a/n = tendency to oath or attestable assurance (*tendance au serment*),

(11) $a(r)/n$ = warranted tendency to oath (*tendance au serment véridique*),

(12) $a(w)/n$ = unwarranted tendency to oath (*tendance au faux-témoignage*),

(13) $a(r)/a$ = reliability of oath (*fidélité du serment*),

(14) $a(w)/a$ = unreliability of oath (*infidélité du serment*).

Note. — The fourth formula is used by many writers in place of the fifth for accuracy of report; as here indicated, however, the indeterminate cases ("I don't know") are omitted from the denominator in computing accuracy.

Next to range and accuracy the most important coefficient is probably warranted assurance (8th formula), as a high ratio indicates a good witness who reports a large number of items both correctly and with assurance. It is unfortunate that only a few investigators have taken pains to collect data with regard to the factors of certainty, assurance, etc., for this is, psychologically, a most promising phase of the work.

But the method of grading is not entirely settled with the determination of these formulæ, since diversity of opinion has arisen with regard to their application.

In illustration, the determination of P, and hence of relative range of report, raises the question: how many 'mental units' does the experience contain? In a picture-test, for example, is it adequate to report 'a man,' or should the reporter be expected to state the color of his coat, his stature, his complexion, his facial expression, the form of his collar, or the number of buttons on his vest? We must evidently avoid psychological atomism. The most practical working rule is to call 'one item' any combination of features that forms a single natural working group, the details of which would escape individual observation under ordinary conditions.

In further illustration, the computation and grading of errors raises the question: are all errors equivalent, or should they at least be made equivalent numerically? To forget entirely a man in the foreground of a picture is evidently more serious psychologically than to forget the color of his necktie. Such inequalities of importance in errors of various kinds have led some investigators, *e. g.*, Binet and Stern in their pioneer work, to assign arbitrary values to different items, *e. g.*, 2 debits for errors with prominent, and 1 debit for errors with accessory features, or a debit of 0.5 for a statement partly right and partly wrong, or for a wrong statement made with hesitancy, etc. The use of these and similar arbitrary scales of value affords, as Borst, Larguier, and others have contended, only a fictitious appearance of accuracy, without in the least ensuring real accuracy, and the arbitrarily weighted scale has, in fact, been discarded by its originators.

The psychologically best method of grading is unquestionably to classify the data statistically according to various categories — such as persons, objects, colors, sizes, etc. — and to compute range, accuracy, assurance and the other coefficients for each category separately. This will greatly increase the labor of quantitative treatment, but it will afford valuable insight into the quali-

tative conditions of report that could not otherwise be secured: the several coefficients can, for comparative purposes, be united subsequently into a single series of coefficients for the person or persons under consideration.

In general, it should be said that, despite the confessedly arbitrary character of some of these statistical coefficients, they have justified their introduction, and bid fair to furnish a valuable means for studying the psychological conditions of report, particularly of the mental attitudes of reporters.

Results.

1. *Accuracy.* — The chief single result of the *Aussage* psychology is that an errorless report is not the rule, but the exception, even when the report is made by a competent observer under favorable conditions. Thus, in 240 reports, Miss Borst found only 2 per cent. errorless narratives and 0.5 per cent errorless depositions.[1]

The average reporter, when no suggestive questions are employed, exhibits a *coefficient of accuracy* of approximately 75 per cent.

2. *Range and Accuracy.* — There is no general relation of range to accuracy, though, for a given reporter, it is doubtless true that there is an inverse relation between these two coefficients.[2]

3. *Range and Other Constants.* — There is no general parallelism between range of report and other coefficients which depend upon degree of assurance.

Table I.

Comparative Accuracy of Sworn and Unsworn Statements.

Experimenter.	Stern.		Stern.		Stern.		Borst.	
	Range.	Errors.	Range.	Errors.	Range.	Errors.	Range.	Errors.
Positive statements.....	(100)	13.6	(100)	19	(100)	23	(100)	11.0
Sworn statements.....	76	11	68	7	70	14	60	8.2
Unsworn statements.....	24	20	32	—	30	—	40	15.5
Certain statements.....							97.5	10.1
Uncertain statements...							2.5	44.0

Note. — All figures are in per cents. The results, save those of the third and fourth columns, refer to narratives, not depositions.

4. *Accuracy and Attestation.* — Generally speaking, attestation does not guarantee accuracy: on the contrary, though the number of

[1] These errorless reports are commonly characterized by very small range, *i. e.*, they are the reports of individuals who are extremely cautious and state only what they are certain of.

[2] The reason for this lack of general relation between range and accuracy is presumably that there are two kinds of good witnesses — the one possesses good capacity of observation, recall and report, and heuce exhibits a large range and a high degree of accuracy; the other is cautious, and therefore restricts his range, which may be poor at best.

errors is nearly twice as great in unsworn as in sworn testimony (according to Stern, 1.82 times, according to Borst, 1.89 times as great), there still remains as high as 10 per cent. error in sworn testimony. These relations are shown clearly in the accompanying table (I.).

5. *Dependence on Sex.* — In all of Stern's work, both in narratives and depositions, with pictures, or events, or estimations of times and distances, whether under oath or not, the reports of men have been more accurate (by from 20 to 33 per cent.), though less extended, than those of women, and a similar sex difference has appeared in tests of school children. This superior accuracy of boys becomes more evident when the report is difficult to make. Stern's conclusions have, however, been criticized by both Wreschner and Miss Borst. Wreschner found that in adults women did better than men. Miss Borst likewise found women superior to men in accuracy and range, but inspection of her results shows that the superiority of women consisted in the fact that they returned a larger number of correct statements, and that the men did not make less accurate statements in their more limited reports.

More specifically, Borst found that in the narrative the range of men was 76 per cent. and in the deposition 83 per cent. of the range of women, while the accuracy of men in both forms of report was approximately 96 per cent. of the accuracy of women.

There is a similar discrepancy between Stern and Borst with regard to the tendency to attestation: the former found that men swore to 71 per cent. and women to 85 per cent. of their report, whereas the latter found that men swore to 61 per cent. and women to but 59 per cent. of their report.

6. *Dependence on Age.* — The reports of children are in every way inferior to those of adults: the range is small, the inaccuracy large, and since the assurance is high, the warranted assurance and reliability of assurance are both very low. During the ages 7 to 18 years, the range, especially the range of knowledge, increases as much as 50 per cent., but the accuracy, save in the deposition, does not increase as rapidly (20 per cent.). This development of capacity to report is not continuous, but is characterized by rapid modification at the age of puberty.

The one factor that more than any other is responsible for the poor reports of children is their excessive suggestibility, especially in the years before puberty.[1]

Stern has endeavored to analyze in part the development of the child's capacity to report, and has distinguished four stages: (1) the very young child enumerates only isolated objects or persons (Binet's enumerator type); (2) at

[1] On the general subject of children's reports, consult the work of Binet, Stern, Lobsien, Borst, and Plüschke.

about the eighth year, actions are reported more carefully ; (3) during the years 9–10, attention is for the first time paid to spatial, temporal, and causal relations ; (4) in a still later period there appears the capacity to make a qualitative analysis of the constituent features of the objects reported.

This development in the capacity to make adequate report is to be attributed to the development of new apperceptive categories or points of view from which to classify and report the several features of the original experience : in other words, the child sees and hears and reproduces what he wants to see and hear and reproduce ; he observes not so much what is placed before him as what his instincts and interests prompt him to observe, so that mental development is not so much a progress from observation to concept as from concept to observation.

The unreliability of the child in the face of suggestion indicates that the narrative is far more reliable than the deposition in the testimony of children. Jurists who have followed the progress of the psychological study of testimony are not as yet agreed upon the age at which children's testimony may be worthy of admission in legal procedure.

7. *Dependence on Intelligence.* — We have as yet no conclusive experiments upon the relation between accuracy of report and general intelligence. The work of Miss Borst indicated that in the deposition the more intelligent child surpasses the less intelligent child in all respects — especially in range, accuracy, and warranted assurance. On the other hand, the same experiments indicated that these relations are nearly all (save that for range) reversed in the narrative form of report.

8. *Defectives.* — The reports of defectives, paralytics, epileptics, the insane, etc., show, as one might expect, a very high degree of inaccuracy, even when the pathological condition is not seriously developed. Such persons are also highly suggestible (de Placzek).

9. *Dependence on Time-interval.* — Lengthening of the time-interval between experience and report exerts, as one might expect, a generally unfavorable influence, but there is nothing like the loss in efficiency shown in curves of memory for nonsense syllables, as in the familiar Ebbinghaus test : indeed, for some reporters the report seems to be somewhat improved after several days have elapsed, and, in general, the conditions are so complex as to demand further special investigation.

TABLE II.

EFFECT OF TIME-INTERVAL ON RANGE AND ACCURACY.

Form of Report.	Narrative.		Deposition.	
Intervals in Days.	3	9	3	9
Range	40.6	39.6	67.2 per cent.	65.5 per cent.
Accuracy	89.5 per cent.	87.9 per cent.	82.6 per cent.	83.4 per cent.

From his earlier tests, Stern computed a fairly constant decrease of accuracy with time, amounting, on the average, to a loss of 0.33 per cent. per day over the period of 3 weeks which he studied: similarly, Borst computed a decrease in accuracy of 0.27 per cent. per day during a period of 6 days. Some of her results are presented in Table II.

Though range and accuracy seem thus to suffer with the lapse of time, assurance, as shown by the number of certain and attested statements, is not, it seems, equally affected, but shows either a surprising constancy, or, if anything, a tendency to increase. From this it may be concluded that assurance and tendency to oath are due to the 'personal equation' of the reporter rather than to the freshness of his memory. It would follow, of course, that warranted assurance and warranted tendency to oath decline with the lapse of time.

10. *Dependence on Contents or Features.* — Not all the features of the original experience are reported with the same frequency or with the same accuracy: there is, rather, a process of selection, both in the process of observation, and also, probably, in memory and in the formulation of the report. In general, we may say that persons and their acts, objects, things, and spatial relations are reported with considerable accuracy (85–90 per cent.), whereas secondary features, especially quantities and colors, are reported with considerable inaccuracy (reports on color have an error of from 40 to 50 per cent.).

The order of frequency with which the several features are spontaneously mentioned in the narrative does not accord exactly with the order of accuracy. Thus Stern reports for the order of frequency: (1) persons, (2) actions, (3) objects, (4) spatial relations, (5) numbers, (6) qualities, (7) colors; and for order of accuracy: (1) qualities, (2) spatial relations, (3) persons, (4) objects, (5) actions, (6) colors, (7) numbers.

Miss Borst's results are: for frequency, (1) objects and persons, (2) spatial relations, (3) numbers, (4) colors, (5) qualities, (6) actions; for accuracy, (1) spatial relations, (2) objects and persons, (3) qualities, (4) actions, (5) numbers, (6) colors.

It seems probable, from Jaffa's work, that a somewhat similar order, both for frequency and for accuracy, would obtain for event-tests as for the picture-tests on which the above conclusions are based.

11. *Dependence on Form of Report.* — All authorities agree that the use of the interrogatory, whether of the complete or incomplete form, increases the range and decreases the accuracy of the report. Thus, in comparison with the narrative, the range of the interrogatory may be 50 per cent. greater, while the inaccuracy (of the incomplete interrogatory) may be as much as 550 per cent. greater. In general terms we may say that about one tenth of the narrative is inexact, but about one quarter of the deposition. Typical statistics are given in Table III.

TABLE III.

DEPENDENCE OF REPORT ON ITS FORM.

Author.	Range.		Accuracy.	
	Narrative.	Deposition.	Narrative.	Deposition.
Stern	25.5	52.1	94 per cent.	67.1 per cent.
Borst	40.5	65.6	89 per cent.	83.0 per cent.

Note. — In comparing these figures it should be remembered that Stern used an incomplete and Borst a complete interrogatory.

Gross contends that this apparent inaccuracy of testimony under interrogation does not accord with the facts of legal procedure, and argues that it merely shows that psychologists do not know how to ask questions; other jurists, however, *e. g.*, Schneickert and Heilberg, do not share this opinion. One may feel inclined to retort that if such superior ability be possessed by some judges, they at least had to acquire it by long experience, and that the browbeating of the average court lawyer does not suggest extraordinary caution in the avoidance of suggestion.

Although the interrogatory opens up a wider range of memories on the part of the reporter than does the narrative, it does not necessarily, even when seemingly exhaustive, develop the total latent memory of the original experience. For this residuum of recall the method of recognition will suggest itself, a method that has an analogue in the 'confrontation' of the legal profession. We need further information concerning the value of this recognition method for the psychology of report.

12. *Dependence on the Type of Question.* — The introduction of leading or suggestive questions very noticeably decreases the accuracy of report for children and, unless the conditions of report are quite favorable, even for adults.

In his comparison of different types of questions, Binet found 26 per cent. error for indifferent, 38 per cent. error for moderately suggestive, and 61 per cent. error for strongly suggestive questions. The greater suggestibility of children is shown by Stern's results in which the inaccuracy of boys and girls aged 7 to 14 was from 32 to 39 per cent. as against 10 per cent. inaccuracy for young men aged 16 to 19 years.

13. *Dependence on the Ideational Type of the Reporter.* — The best reports are given by observers of a mixed ideational type, *e. g.*, acoustic-motor or visual-motor (Borst): even in a picture-test, the purely visual-minded observer is inferior, though less open to suggestion (Lobsien).

A characteristic analysis of reports, for the purpose of classifying reporters into ideational types, is seen in Binet's description-of-an-object test, on the basis of which he distinguished four types of reporter — the observer, the describer, the emotionally-minded, and the erudite. Miss Borst was unable to use this classification, however, with her observers.

Another classification of reporters according to mental type was attempted by Miss Borst, who, after a preliminary tachistoscopic test, compared the reports of 'fixating' and 'fluctuating' observers, and concluded that observers whose attention is of the 'fixating' type have uniformly the greater warranted assurance of report.

14. *Hear-say vs. Eye-witness Evidence.* — When the account of a given experience is transmitted from one person to another by serial repetition ('rumor-test'), the effect is to produce, on the one hand, exaggerations (*Steigerung*), *e. g.*, verbal quarrels become fistic encounters, and on the other hand, a sort of lessened delicacy of expression (*Vergröberung*) such that what are at first mere possibilities or inferences become unqualified actualities. In general, the effect of serial transmission is similar to that of long time-interval: the range is reduced, and the accuracy, both for important and for secondary features, is greatly diminished.

Külischer reports the average accuracy of 10 eye-witnesses and of 10 hear-say reporters as follows: for the narrative, eye-witnesses, 95 per cent., hear-say reports, 79 per cent.; for the deposition, eye-witnesses, 62 per cent., hear-say reports, 54 per cent. When the reports are more difficult, the discrepancy is greater, *e. g.*, for colors, eye-witnesses have an accuracy of 46 per cent., hear-say reporters of 25 per cent., while in answering suggestive questions, the accuracy of the former was 55 per cent., of the latter only 14 per cent.

15. *Estimates of Duration and Magnitude.*— Although more work is needed here, especially upon the relation between estimates from memory and those from direct observation, the evidence is at present that, as regards duration, brief periods (up to 1–2 min.) are strongly overestimated, and that this tendency diminishes until at 5 min. it is inappreciable, while from 10 min. on there appears a slowly increasing tendency to underestimation.

As regards spatial magnitudes, Stern concludes that within a certain range of average dimensions (1–4 m., like the size of a window, height of a blackboard, etc.) estimates are fairly accurate: smaller sizes, *e. g.*, dimensions of a book, are somewhat overestimated; larger dimensions, at least up to 50 m., *e. g.*, length of a corridor, are underestimated, but a 350 m. road was generally overestimated.[1]

16. *The Effect of Repeating a Report.* — When a given reporter is called upon to make his report several times, the effect of this repe-

[1] Gross proposes by actual trial to test the accuracy of witnesses who are called upon to testify to durations or sizes. Such a plan would be more practical if we had more data upon the psychology of estimates. The writer has instituted experiments that may contribute something to this phase of the *Aussage* psychology.

tition is complex, for (1) it tends in part to establish in mind the items reported, whether they be true or false, and (2) it tends also to induce some departure in the later reports, because these are based more upon the memory of the verbal statements of the earlier reports than upon the original experience itself, *i. e.*, the later reports undergo distortion on account of the flexibility of verbal expression.[1]

17. *The Effect of Practice.* — Simple practice in reporting, even without special training or conscious effort to improve, facilitates and betters the report, as is shown in Table IV., from Miss Borst. It will be noted that the tendency to oath and warranted tendency to oath are both particularly improved by practice, and that there is also an appre-

TABLE IV.

EFFECT OF PRACTICE UPON COEFFICIENTS OF REPORT (NARRATIVE).

Number of Report (Test).	I.	II.	III.	IV.	V.
Range	39.0	39.0	42.3	40.3	42.0
Accuracy	86.6	87.7	92.9	88.2	90.0
Assurance	96.6	96.4	97.8	97.9	98.6
Warranted assurance	84.0	87.0	91.0	88.0	89.0
Reliability of assurance	87.5	89.4	92.6	89.8	90.3
Accuracy of assurance	97.0	98.0	98.4	98.6	99.2
Tendency to oath	43.0	59.8	62.8	61.9	72.1
Warranted tendency to oath	40.2	53.2	58.5	57.5	66.5
Unwarranted tendency to oath	2.8	6.6	4.3	4.4	5.6
Reliability of oath	93.0	88.8	92.5	93.0	91.7

Note. — The effect of practice in these tests is somewhat obscured by the fact that the first and third tests were made after a 3-day, the others after a 9-day interval.

ciable improvement in range, accuracy, warranted assurance, and reliability of assurance, whereas assurance and accuracy of assurance are scarcely affected. Similar practice-effects may be discerned in the deposition. From these results it is clear that the several coefficients of report may vary more or less independently.[2]

[1] It is evident that further experiment is needed here, also, for there is evidence that repetition may in some respects improve the report, at least for some reporters : most writers, however, believe that legal procedure should, in so far as possible, be arranged to reduce the number of times that witnesses are called upon to testify.

[2] There are needed, it seems to me, further experiments with careful introspective control by trained adults, so that we may secure a more adequate analysis of the factors that are affected by practice : the previous investigators have relied too much upon mere statistical evaluation, whereas the field is now ripe for an introspective analysis of the mental operations concerned in report — an analysis that should, of course, make the utmost use of the statistical method for check and control.

18. *The Educability of Report.* — The capacity of children to observe and report in a detailed and accurate manner may be improved by systematic training. This education may be best secured by appeal to zeal, interest, enthusiasm, or desire for improvement on the part of the child; more formal training of an intellectual type, *e. g.*, suggestions for systematic observation, specific training in sense-perception, instruction designed to augment appropriate apperceptive-masses, etc. — is much less effective.[1]

The inadequacy of the child's report is due not so much to poor memory as to the fact that he fails to perceive many features in the original experience, that he fails to put into words even what he does perceive, and especially to the fact that he is absurdly uncritical (his assurance, indeed, commonly reaches 100 per cent.). The education of the child in observation and report must therefore be directed in part to puncturing this bubble of unhesitating confidence and faith in his capacity to give unerring reports.[2]

Conclusion.

It has been my aim to show that in the psychology of testimony there exists an important and interesting field of psychological investigation that affords both opportunity for the theoretical psychologist to undertake in his laboratory the analytic study of individual differences, and opportunity for the applied psychologist to develop and exploit principles of great practical significance.

The 'report' arises from processes of perception, and thereby in-

[1] These conclusions are based upon Miss Borst's study of the educability of the report in the case of children aged 6 to 7 years: it may be that her pupils were too young to profit by the more intellectual training, but that this might be very serviceable for older children. In fact, Miss Borst intimates that all these methods should be combined for the best results. If, then, her results may be generalized to apply to other phases of school training than the *Aussage*, we may conclude that, in order to show improvement in a given capacity, children need (1) training in the logic of method, (2) an increase of knowledge especially in those matters that apply to the situation in question, and (3) an increase of good-will, zeal, and desire for improvement. The high degree of importance which is to be attached to the third point indicates that formal, cut-and-dried drill, in order to be effective, should be accompanied by active interest and willing coöperation on the part of the pupil. In other words, the child improves when he wants to improve and is convinced that he can improve.

[2] A witness whose testimony is poor because of this lack of judgment and proper caution may be trained by showing him how many and what kind of errors he commits, but a witness whose testimony is poor because of slips of memory is much harder to train, if indeed this defect can really be repaired at all by educative measures.

volves the whole psychology of sensation, attention, and apperception; it hinges upon retention and recall, and thereby involves the whole psychology of memory; it issues in verbal statements, and thereby involves the psychology of language and expression; it is conditioned by numerous subjective factors, such as ideational type, emotional reaction, temperamental tendencies, sentiment, susceptibility to suggestion, etc. In short, the study of the report possesses the very considerable advantage that it is the study of a coherent functional complex of processes as they appear in daily life in response to concrete situations of a familiar and frequently-recurring type, so that the feeling of abstractness, artificiality, and isolatedness that sometimes characterizes the laboratory experiment is very largely absent.

The problems of this branch of psychology are very clearly set; the methods are well developed, but there remains a great deal of work to be done, and, in this country at least, the workers are few.

Literature.

The following references do not exhaust the field of the psychology of report, but will serve as a guide to the chief sources of information.

A. The most important single source is Stern's *Beiträge zur Psychologie der Aussage*, Leipzig, 1903–6. Lack of space forbids the itemizing of the numerous titles: besides extended reviews, communications, reports of lectures, etc., this periodical contains important articles by Stern, Jaffa, Cramer, Lobsien, Lipmann, Borst, Bogdanoff, Rodenwaldt, Oppenheim, Kosog, Wendriner, Günther, Gottschalk, and others.

B. The following are other important references.[1]

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PSYCHOLOGICAL LITERATURE.

THE JAMES VOLUME.

Essays Philosophical and Psychological in Honor of William James, Professor in Harvard University. By his Colleagues at Columbia University. New York, Longmans, Green, and Co., 1908. Pp. viii + 610.

It has often been remarked since the appearance of this volume that it forms a notable tribute to the distinguished scholar to whom it is inscribed. The learned world is familiar with *Festschriften* composed by companies of pupils in honor of their teachers or by groups of writers to celebrate some university festival. It is unknown, or at least uncommon, for the departmental staff of another institution, most of whose members have not been pupils of the leader whom they honor, to unite in the issue of a collective dedicatory work. Thus the members and former members of the Department of Philosophy and Psychology at Columbia have taken opportunity to express the obligation which is felt toward Professor James by scholars everywhere, they themselves the while acknowledging a debt of an especially intimate kind.

The work comprises thirteen essays classed as philosophical and six specifically devoted to psychology. This arrangement, however, is not entirely exclusive. Professor Lord's paper, 'The Abuse of Abstraction in Ethics,' for example, proceeds on a psychological analysis so comprehensive and exact that it becomes a model of what psychology can do toward grounding another science of the mental group. Professor Thorndike's 'A Pragmatic Substitute for Free Will,' on the contrary, although it is classed under the rubric of psychology, includes a considerable amount of speculative physiology and ultra-realistic theory in its 'pragmatic' escape from a fundamental philosophical problem. It is worthy of notice, moreover, that many of the distinctly philosophical papers imply a psychological basis. In particular, the idealistic-realistic group of eight with which the book begins yield abundant evidence of the writers' loyalty in this respect to the traditions of the English school. Fullerton's 'New Realism,' which is tempered more than others of the essays by recollections of idealistic days, Woodbridge's 'Perception and Epistemology,' Miller's

'Naïve Realism; What Is It?' show not only a preoccupation with the problems of perceptive consciousness which would have delighted the Fathers from Locke to Hume, and Reid, and Hamilton, but an appeal to psychological or empirical fact less usual in the epistemology of later times. Even Lovejoy's 'Kant and the English Platonists,' in its endeavor to prove the presence of Kantian doctrines in Cudworth, More, Norris and Collier, if it cannot be said to adopt the empirical point of view, starts from James's California address to 'outflank' the Königsberger. Whether such comparative neglect of the greater Germans will in the event strengthen the position, is a different question — one which is more pertinent to the aims of a philosophical than to those of a psychological review. The realistic reaction, it may be remarked, is a wholesome and encouraging factor in the present philosophical situation. It should, however, be remembered that the traditional doctrine at the end of its early course came on somewhat serious problems which of itself it proved inadequate to resolve.

A second point of interest to psychologists, and suggestive of inherited tendencies, is the relative underestimation of the significance of will in the grounding of philosophical theories. It is remarkable that a group including so many thinkers with pragmatic leanings should relatively neglect the volitional factor. There are indeed exceptions. Professor Cattell in his 'Reactions and Perceptions' emphasizes the benefits which have accrued to psychology from the recognition of the dependence of cognition and feeling on motor processes. Professor Montague in his 'Consciousness a Form of Energy' strives bravely, if unconvincingly, to solve the puzzle of the relation of consciousness to the physical world. But even Professor Dewey, though he answers with an urgent affirmative the question, 'Does Reality Possess Practical Character?' is more concerned to prove that 'knowledge makes a difference to and in things,' or that the practical character of reality 'is most efficaciously expressed in the function of intelligence' (p. 58), than to recommend the interpretation of reality in volitional terms. Does this type of pragmatism, then, issue in a reversal of a cherished first principle of the school at large? Here once more we come upon questions which transcend the limits of psychology proper. But they are suggested by various other essays of the 'Chicago-School,' as well as by those included in this volume. Does the continued accentuation of the 'practical character' of cognitive processes result simply from the conditions of the debate, or is biologico-genetic pragmatism intellectualism upside down?

The several essayists differ more widely in regard to a third problem, which belongs to the philosophy of mind, the question of the nature or even of the existence of conciousness itself. In the paper which has been already mentioned Professor Fullerton adopts positions which would be welcome to the defender of mind. Professor Strong also advocates conservative views in his acute discussion of 'Substitutionalism.' It is instructive to note, moreover, that Professor Strong believes his noëtics to be in essentials that of James, ascribing 'honor then to whom honor is due' (pp. 190–1), while Dr. Bush concludes his historical study, 'A Factor in the Genesis of Idealism' with the following words:

"When Professor James asked his epoch-making question 'Does consciousness exist?' he let in the kind of light that is often more salutary than welcome. Not less emancipating was his declared belief that consciousness is 'the faint rumor left behind by the disappearing "soul" upon the air of philosophy'" (p. 102).

Between the two extremes falls Woodbridge's relational theory, which leaves consciousness a reality, but a reality of an exceedingly tenuous and incidental kind. So the discussion leads to corollaries whose seriousness is patent and which need to be further thought through to their conclusion.

Further essays in the philosophical group are Dr. Pitkin's Socratic dialogue in defense of the face-value of perception, 'World-Pictures' (pp. 193–229); Dr. Adler's 'A Critique of Kant's Ethics,' reprinted by permission from the eleventh volume of the New Series of *Mind;* Professor Tawney's 'Purposive Consistency, the Outline of a Classification of Values' (pp. 395–423); and Dr. Brown's 'The Problem of Method in Mathematics and Philosophy' (pp. 425–458). Two of these, it will be noted, consider topics in practical rather than theoretical philosophy. Similarly the first of the distinctively psychological papers, Dr. Kate Gordon's 'Pragmatism in Æsthetics,' discusses the problem of æsthetic values from the pragmatic point of view. Dr. Wells and Dr. Naomi Norsworthy devote their essays to statistical inquiries. The former reports an extended investigation of the variability of judgment in three of its classes, æsthetic preference, color differentiation, and the comparison of weights, and tentatively concludes to 'a quantitative criterion of the subjective' (pp. 547–9). As a result of her researches, Dr. Norsworthy holds that it is possible to obtain reliable and significant numerical estimates of character (p. 567). In the remaining paper Professor Woodworth continues his valuable discussion of 'The Consciousness of Relation.' In this there is much

of essential soundness and importance. It is inspiriting to follow a 'new psychologist' as he confirms ancient and classic doctrine from the experimentalist's position. Undoubtedly 'imageless thought' is a reality, provided the terms be interpreted in strict accordance with the phenomena for whch they stand. There is, however, a subtle danger that the positive argument may itself be confused by the image assumption. In order to disprove the limitation of cognition to imagery, one may stake the issue on the existence of states which, although they be not images, shall yet be ideas of content. Hence the search for specific *feelings* of relation, a phrase which is far less happy than 'consciousness of relation,' or 'thought' taken in the classic and exclusive sense. Hence in part the tendency to overestimate the detachability of the consciousness of relation from the consciousness of the related terms, and yet to doubt the utility of the feeling (pp. 506–7). And hence, conversely, the risk that cognitive data, 'sensations' or 'qualities,' be interpreted in an atomistic fashion, as primarily separate from relating consciousness altogether. Finally along this line of reflection, the question of language gains emphatic relevancy and the substitution in the total relating experience of the linguistic symbol for the primary objective imagery. If such questions as these are raised, they must not be construed as implying any depreciation of Professor Woodworth's real achievement. Partly based on his specific discussions, partly emerging from the question at large, they only suggest that as the research under review reinforces time-honored views, so in its development and application account is to be taken of alternative conclusions which are also typical.

The book as a whole is well gotten up and printed. The frontispiece is an excellent portrait of Professor James. An index could scarcely have been expected in a work of this character, but it is to be regretted that the careful analyses of their essays which are given by most of the contributors were not printed, in English fashion, at the beginning of their papers.

A. C. Armstrong.

Wesleyan University.

MEMORY.

La définition de la mémoire. L. Dugas. Rev. phil., 1907, LXIV., 365–382.

Certain of our sensory experiences cannot be recalled because they were inadequately perceived; others are forgotten because they were not deemed worthy of remembrance. Many of them, however,

recur spontaneously or may be recalled at will. Remembering depends not upon the mere receipt of impressions, but rather upon the mental reaction of the recipient; and this reaction consists in a process of selecting, systematizing and assimilating, which results in a making-over of the incoming material. In certain instances, the subjective reaction may be slight or even lacking (as in the '*pure*' memory of Bergson); but these instances are not typical. Moreover, this passive receipt of impressions represents the lowest form of memory because material which has thus been acquired *en bloc* flits into memory and out again in a most fortuitous fashion, and is not subject to recall at will. It is only with impressions which have to some extent been organized and rendered subject to voluntary recall that true memory deals. Yet when the assimilation and synthesis is complete, when the material has acquired a permanent place in the content of mind, we have to deal not with memory but with knowledge, habit, disposition, capacity. Memory has to do exclusively with partially assimilated material: and the criterion of memory is one's consciousness that the content is a recalled datum, and that it is not a part of that indefinite whole which has been designated personality, character, or the ego. Two opposing tendencies come into play in the receipt of impressions: a tendency to inhibit the personal reaction (and to issue in knowledge), and a counter tendency to exaggerate the personal contribution (resulting in imagination). Memory results from a balancing of these opposing tendencies.

EDWINA ABBOTT.

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The Transfer of Improvement in Memory in School Children. W. H. WINCH. British J. of Psychol., 1908, II., 284–293.

The author has performed three series of experiments with the following question in view: "Is the improvement in memory, gained through practice in one subject of instruction, transferred to another subject which has not been practiced? For example, will children practiced in learning poetry learn another subject, such as history or geography, more readily because of their improvement through practice in learning poetry?" The experiments made by our author are less complete and less carefully controlled than those made by Professor Meumann. But they have the advantage of confirming the others on a large number of pupils — more than one hundred — and on material that is used in actual school practice.

The experiments were performed on school children selected from the classes of London girls' elementary school, from three neighbor-

hoods of different social standing. Each class was divided into two groups of approximately equal ability as to memory. This division was done "partly on an actual test, and partly on the opinion of the teacher of the class, who had a quite exceptional knowledge of the capabilities of her pupils." The tests were made by learning selected passages from a historical reader. The training consisted in committing poetry or selected passages from a geographical reader, which was not in the ordinary way accessible to the pupils. Ten minutes were allowed for memorizing. The work was mainly visual. The pupils were then required to reproduce in writing as much as they could remember. For this reproduction was allowed fifteen minutes. After such a test had been made one group of pupils spent four periods in committing to memory about one hundred words of poetry, while the others were engaged in doing sums. In marking the exercise one mark was allowed for each word rightly remembered and correctly placed. But from the total thus obtained, a mark was subtracted for every word omitted, inserted or substituted in the sentences recalled. The time allowed for each test and exercise and the method of marking were the same for all pupils tested. On the fifth morning after experimenting, each group committed a second test passage.

The results show that the girls who had the special practice averaged nearly 10 per cent. better than the girls without this training. "Improvement, gained by practice in memorizing one subject of instruction, is transferred to memory work in other subjects whose nature is certainly diverse from that in which the improvement was gained." And when the two first divisions were again grouped with regard to age and attainment, every group with special training did better than the corresponding group without this practice.

The author reserves the relation between rote-memory and substance-memory in pupils for later consideration.

PAUL R. RADOSAVLJEVICH.
NEW YORK UNIVERSITY.

Mémoire de l'orthographe. M. MÉTRAL. Arch. de psychol., 1907, VII., 152–159.

Miss Métral's experiments were suggested by the work of Schiller (1898) and of Payot (1906). Her study aimed to determine what conditions of presentation are most favorable to recall in learning to spell. The material presented consisted of groups of unfamiliar words; and the observers were nineteen girls between seven and nine years of age. Seven methods of presentation were employed:

1. The word was spelled aloud, in the usual manner, by the experimenter.

2. The word was spelled aloud, syllable by syllable, and then pronounced by the experimenter.

3. The word was spelled aloud, first by the experimenter and then by the observers.

4. Same as 3, excepting that each syllable was pronounced separately.

5. Same as 3, but preceded by a definition and explanation of the word.

6. Same as 5, but with each syllable pronounced separately.

7. The experimenter first defined the word; spelled it, syllable by syllable, and wrote it upon a black-board. Then she and the observers spelled it, syllable by syllable; then the observers traced the form of the word with the finger while again spelling it aloud.

Each series was presented twice with an interval of about three weeks intervening; and each presentation was immediately followed by three minutes' distraction. Immediately after the distraction, the records were taken by having the words written from the teacher's dictation.

The results show that the seventh method was most favorable for recall; and that the second method was least favorable. The complete seriation was as follows: Seventh, sixth, fourth, third, fifth, third, first, second. It is not surprising that the method of presentation which furnished most aids to memory should give the most successful recall; but it is remarkable that the second method should stand at the foot of the list. It would appear that syllabic spelling is of value only when done by the learner himself. The results show too that the defining of the word furnishes little or no aid in learning to spell.

Miss Métral repeated her experiments, under slightly modified conditions, with boys between the ages of seven and nine years. The former conclusions were, in the main, confirmed; but presentation syllable by syllable here proved to be more advantageous than presentation letter by letter. The author emphasizes the importance of employing methods of presentation which appeal to various sorts of imagery.

EDWINA ABBOTT.

UNIVERSITY OF ILLINOIS.

IMAGE AND PERCEPTION.

The Function of Images. W. H. WINCH. J. of Philos., etc., 1908, V., 337–352.

Winch finds that some people have few or almost no images. These persons are intellectually the equals of other people. Further, images are an actual hindrance to certain conceptual processes. Retrospect may give rise to images that are then assumed to have been a part of the earlier perceptual process. Schematic simplicity alone favors the view that images are 'cues' to movement.

Does the image function in perception? Winch cites the case of accurate perception (!) in lower animals, a case of simple sensory recognition, three instances where perception is reduced almost to an habitual reaction and one instance of a wrong perception, as argument against a sweeping affirmation to this query. Further, imagery is very slow as compared with the rapidity of perception. Experimental evidence gathered independently by Smith and Snowton, Thorndike, and the writer shows that abundant visual imagery does not aid in comparison and memory. Winch tends to extend this evidence as an argument against imagery of all kinds, though the experiments deal only with complex visual imagery.

In voluntary motion, though citing instances, *e. g.*, Professor Woodworth's article in the Garman Memorial volume, where images apparently do not appear, Winch finds "that the case is (not), as yet, closed against them." "Are Images Sensory?" The water 'looks cool'; both the appearance and the coolness are sensational. In synæsthesia the color attendant on auditory stimulus is 'better described as sensation'; the connection is due to sensory centers not yet differentiated. Actual kinæsthetic sensations constitute the great bulk of so-called kinæsthetic imagery. Much 'imagery' is really sensational in character. Winch would use 'image' where we mean image only, and retain 'idea' for 'imageless thought.'

CLARENCE S. YOAKUM.

UNIVERSITY OF TEXAS.

REPORTS.

MEETING OF EXPERIMENTAL PSYCHOLOGISTS.

The sixth annual gathering of experimental psychologists was held in the psychological laboratory of Princeton University, on April the eighth, ninth and tenth, with an attendance of twenty-three. The greater part of the time was, as usual, devoted to a consideration of

investigations going on in the different laboratories, but a few set papers were also read.

Thursday's meeting was devoted entirely to informal reports. Professor Titchener reported progress on problems continued from last year. He has found the reaction method applicable to affective processes. Miss West's study of the imagination is now nearly ready for publication. Professor Bentley is still working on the problem as to whether attention alters the intensity of the sensations attended to. His results will probably be positive, *i. e.*, when one attends one overestimates that which is attended to or underestimates that from which he is distracted. This year the Cornell laboratory as a whole is mainly devoted to a study of thought. Professor Titchener wishes to find out whether he can get transition forms between imaged and imageless thought. With this in view, investigations are going on on belief, doubt, expectation, etc. He is also trying to see whether those who claim to have imageless thought cannot find some images present. He is studying, too, memory image fluctuations, attempting to meet the difficulty of objective control.

Dr. Wells reported that the McLean Hospital laboratory has been mainly concerned with the symptom of psychomotor retardation in manic depression. In experiments with the tapping test, the retarded individual's reaction showed three differences from the normal, (1) a general slowing of the rate, (2) a tendency for the rate to increase where the normal would show a fatigue loss, and (3) a greater transference of 'warming-up effect' from one hand to the other. The measure here being finer than the ordinary clinical tests he thinks it may prove useful. He has also experimented on the electrolytic phenomena in the human body, finding indications that these phenomena are related to mental activity in much the same way as the different aspects of vasomotor and other involuntary processes that have been observed.

Mr. Woodrow reported for Columbia. Mr. Breitwieser is studying the effect on reaction of varying the resistance of the key. He finds that the simple reaction time increases as the resistance increases. He is also studying the effect of excess of pressure, distractions, and the length of interval between signal and reaction. Mr. Hollingworth is making a study of the errors in the perception of movement, of judgments of extent and time of movement, of the Loeb illusion, of the block illusion, etc., with special reference to the constant errors. He finds the indifference point where movements are neither over- nor underestimated changeable. Time and extent of movement seem inde-

pendent of each other. Messrs. Rice and Ash are working on the relation between visual acuity and the degree and color of the illumination, and the relation between both of these and the contractions of the pupils, also the effect on visual acuity of foreign lights in the field of vision. Mr. Rejall has begun a study of the comparison of the mental and physical traits of criminal boys with those of normal boys. He has found no positive results as yet.

Professor Watson, of Johns Hopkins, is continuing work on the color vision of monkeys. He has also started work on the homing instinct of pigeons. He thinks the birds may use some delicate cutaneous senses and is testing the hypotheses that the birds find their way by means of olfactory stimuli or by forming visual associations. He is also studying auditory sensitivity in blind dogs.

Professor Sanford reported that at Clark work is being done on the higher intellectual processes. One experiment has to do with the relation of attention to learning. He finds no support for the theory of unconscious help. Other experiments are : Improvements in skill in intervals of no practice, the relation of attention to the swelling out of tone of remaining tuning forks when some are stopped, and the study of mnemonic devices. Professor Porter is working on color discriminations in pigeons, quail and parrots and continuing his work on instincts and their variations in spiders.

At Johns Hopkins Dr. Dunlap is working on the reaction time to visual stimuli, attempting to see whether this can be reduced by cutting out eye-reactions, while Dr. Burrow is making a study of complications similar to the work of Klemm. Contrast effect on pitch is also being studied.

On Friday morning the reports were continued. Professor Dodge has been working on muscular fatigue. With eye-movements he found that after a number of movements which were nearly straight there would come a dip downward in the movement and then the movements would become normal again and so on. The knee-jerk he found much affected by conscious phenomena. There seemed, too, to be waves of variation of amount of knee-jerk. The quadriceps reflex he found to be shorter than the triceps, a difference which seems to be due to time of nervous transmission. Fatigue of knee-jerk is shown by abnormalities in the reflex after about twenty reflexes.

Professor Leuba demonstrated an apparatus for the study of movements of the elbow joint. Using this apparatus his experiments lead him to think that movements which are made in equal time seem equal, showing that there is a comparison of durations of some particular sensations.

Dr. Geissler, of Cornell, has been working on degrees of attention and their relation to clearness. Distractions have not proved as effective as was to be supposed. He finds that the quality of work varies with the clearness of attention as given introspectively.

On Friday afternoon Professor Hayes reported on his studies in color blindness at Mt. Holyoke. He has discovered a case of color-blindness in one eye, the other being normal, and has been trying experimentally to find how colors look to the abnormal eye by matching with colors seen by the normal eye. He found that green was in its proper place in the spectrum but unsaturated. The spectrum was shortened at the red end for the abnormal eye. He is now working upon many different phases of the problem of color-blindness.

Dr. Rogers, of Harvard, has begun work on experiments in applied psychology. He has been trying to see whether one can find psychological tests which will be helpful in determining a person's fitness for certain occupations. He finds that simple reaction time is not a test as to what a subject will do under complicated conditions. Professor Holt, continuing his work on dizziness, has found no cause of dizziness apart from eye-movements. If nystagmus is stopped by fixing the eye before it begins its quick movement, no dizziness results. Some seven or eight other experiments are being carried on in the Harvard laboratory.

Professor Bolton, in experiments on memory tests, finds that long series seem to have been remembered despite changes of order for many days during which the subject seems unconscious of what the series was. He has also been experimenting with weights.

At Yale, Professor Angier reported, Mr. Williams is studying the forms of reaction under different conditions of attention, distraction, etc. The sensory type form seems distinctly different from the motor type. In sensory reaction there is always an antagonistic reaction preceding the larger reaction, while in the motor reaction the main reaction seems already to have begun when the signal is given.

Dr. Ferree, of Bryn Mawr, read a paper giving in detail his experiments on the blind spot. He finds that complete shrinkage in the field takes place when the stimuli are on opposite edges of the blind spot, the influence of the blind spot falling off rapidly as stimuli recede from its edge and disappearing entirely one sixth of the breadth of blind spot beyond its edge. Distortion of form takes place when the figure lies within the area of shrinkage. Shrinkage is compensated for by an equivalent magnification of spatial values over the area of disturbance. Thus there is no associative filling in of the blind area. There are

zones, too, of partial and total color blindness surrounding the blind spot.

Saturday morning Dr. Ferree reported on his investigation on after-images and contrast aroused by retinal processes which do not themselves give sensations. He found that under the proper conditions he could get after-images and contrast from such retinal processes.

Mr. Clark, of Cornell, reported that he finds the effect of distraction upon the intensity of sound to be an overestimation of the sound distracted from.

Dr. Goddard, of the New Jersey Training School, at Vineland, extended to all psychologists the invitation to make use of the training school for purposes of investigation. He has been making anthropometric measurements on the relation of physical to mental development.

Mr. Woodrow presented some results of a psychophysical investigation of the effect on auditory rhythm of variations in the intensity and duration of the sounds.

Messrs. Dunlap and Vaughan, compilers of the Psychological Index, brought up the question as to the advisability of limiting the scope of this work owing to its increasing size and consequent expense. The prevailing opinion seemed to be that any such limitations would be regrettable.

On Thursday evening Professor Warren entertained the visiting psychologists at a smoker at the Nassau Club, and Friday evening at the same place another informal meeting took place.

On the invitation of Professor Watson it was decided that the next annual meeting should take place at the Johns Hopkins Laboratory.

C. L. VAUGHAN.

PRINCETON UNIVERSITY.

BOOKS RECEIVED FROM APRIL 5 TO MAY 5

Studies in Development and Learning. EDWIN A. KIRKPATRICK, editor. (Contrib. fr. Dept. of Psychol. and Child Study, Fitchburg Normal School. — Arch. of Psychol., No. 12.) New York, Science Press, 1909. Pp. vi + 101.

Essai sur la Psychologie de la main. N. VASCHIDE. (Bibl. de Philos. expér., VI.) Paris, M. Rivière, 1909. Pp. v + 504.

Mental Healing and the Emmanuel Movement; an Editorial Criticism. Philadelphia, Psychol. Clinic Press, 1909. Pp. 47.

La Morale de l'Ironie. FR. PAULHAN. Paris, Alcan, 1909. Pp. 169. 2 fr. 50.

Soziologie: Untersuchungen über die Formen der Vergesellschaftung. GEORG SIMMEL. Leipzig, Duncker & Humblot, 1908. Pp. 775. 12 Mark.

Social Organization. CHARLES HORTON COOLEY. New York, Scribner, 1909. Pp. xvii + 426. $1.50.

La Naissance de l'Intelligence. GEORGES BOHN. (Bibl. de Philos. Scient.) Paris, Flammarion, 1909. Pp. 350. 3 fr. 50.

La Fondement Psychologique de la Morale. ANDRÉ JOUSSAIN. Paris, Alcan, 1909. Pp. 144. 2 fr. 50.

Le premier éveil intellectuel de l'enfant. EDMOND CRAMAUSSEL. Paris, Alcan, 1909. Pp. 200. 2 fr. 50.

Correlation of Efficiency in Mathematics and Efficiency in Other Subjects. A Statistical Study. H. L. RIETZ and IMOGENE SHADE. University of Illinois Bulletin, Vol. VI., No. 10, 1908. Pp. 20. 35 cents.

Mental Activity from a Realist Standpoint. G. F. GOLDSBROUGH. London, Harrison & Sons, 1909. Pp. 71.

Kant. GEORGES CANTECOR. Paris, Libr. P. Delaplane (undated). Pp. 144. 90 c.

L'éducation intellectual et morale. G. COMPAYRÉ. Paris, Libr. P. Delaplane (undated). Pp. 456.

The Origin of Beauty. FELIX CLAY. London, Smith, Elder & Co., 1908. Pp. xviii + 302.

Le Mensonge. G.-L. DUPRAT. Paris, Alcan, 1909. Pp. ix + 212. 2 fr. 50.

The Psychology of Thinking. IRVING ELGAR MILLER. New York, Macmillan, 1909. Pp. xxv + 303. $1.25 *net.*

Psychotherapy. HUGO MÜNSTERBERG. New York, Moffat, Yard, 1909. Pp. xi + 401. $2.00 *net.*

A Pluralistic Universe. WILLIAM JAMES. New York, Longmans, Green, 1909. Pp. 405. $1.50 *net.*

Valuation; Its Nature and Laws. WILLIAM MARSHALL URBAN. New York, Macmillan; London, Swan Sonnenschein, 1909. Pp. xviii + 433. $2.75 *net.*

Self-Control and How to Secure It. PAUL DUBOIS; transl. by HARRY HUTCHESON BOYD. New York, Funk & Wagnalls Co., 1909. Pp. 337. $1.50 *net.*

Mental Fatigue, and its Measurement by the Æsthesiometer. A. R. ABELSON. (Thesis for Degree of Docteur-ès-Lettres, Rennes University.) Leipsic, Engelmann, 1908. Pp. 147.

NOTES AND NEWS.

By unanimous vote of its Council the American Psychological Association will hold its next meeting in Boston in affiliation with the American Association for the Advancement of Science.

The Minnesota Psychological Conference held its first annual meeting April 9, in Folwell Hall at the State University, Minneapolis. The program of the morning session was arranged in the interest of teachers and of town and city superintendents. The following papers were read and discussed: The Psychology of Moral Instruction, by Rowland Haynes; A Preliminary Study of Retarded Children, by F. E. Lurton; Psychology Applied to Education, by J. S. Gaylord. The afternoon session was devoted solely to psychology. The following papers were read: Introductory Class Work in Psychology, (*a*) Matter and Method, by J. A. Hancock; (*b*) The Use of Experiments, by J. B. Miner; Some Experimental Evidence on the Doctrine of Formal Discipline, by L. W. Kline; The Recent Discussions of Imageless Thought, by D. F. Swenson. The business of the Conference is handled by a committee of five composed of three psychologists (one from the State University, one from a college, and one from a state normal school), a city superintendent, and a teacher or high school principal.

Professor Bird T. Baldwin has been granted leave of absence from West Chester State Normal School and Swarthmore College and will pursue advanced studies at Chicago University where he also will hold a lectureship in educational psychology.

The following are taken from the press:

Professor Wilhelm Wundt, of the University of Leipzig, has been elected a foreign associate of the National Academy of Sciences, of Washington.

Dr. J. F. Messenger, professor of psychology and education in the State Normal School, Farmville, Va., has been called to the University of Vermont.

Dr. W. F. Dearborn, assistant professor of educational psychology in the University of Wisconsin, has been called to a similar position in the University of Chicago.

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THE

PSYCHOLOGICAL BULLETIN

PSYCHOLOGICAL ASPECTS OF RELIGIOUS EDUCATION.

BY PROFESSOR GEORGE ALBERT COE,

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Studies in religious education based directly upon the psychology of childhood and adolescence have grown scarce in spite of the richness of the field and the incompleteness of the work hitherto undertaken. Professor Starbuck has continued a series of articles on 'The Child-Mind and Child-Religion,'[1] but this appears to be the only scientific treatment of the topic in recent months. Of especial significance are his discussion of the characteristics of the child-consciousness (not passivity, not lack of sense of self, not inability to reason, but lack of complexity, lack of response to remote stimuli, lack of self-consciousness); the method of religious growth (instinct-tendencies refined by being carried onto higher levels, by repression and inhibition, by substitution, by admixture); the nature of the religious impulse (a compound inclusive of the whole impulse to live), and a fresh analysis of the stages of growth.

Apart from a single chapter of popular character,[2] the historic connection between religion and education has remained untouched, although the present interest in pragmatism and values might lead one to look for a thorough investigation of the pragmatic side of this connection.

The continuity of religious education with the developing life of

[1] *Biblical World* (Chicago), July, August, September and November, 1907; February, 1908; January, 1909.

[2] 'What Religion has to do with Education.' Ch. VI. of F. S. Hoffman's *The Sphere of Religion*, New York, 1908.

both the individual and society is beginning to be a presupposition of both Catholic[1] and Protestant education. This principle comes to unusually clear expression in the Proceedings of the Religious Education Association.[2] The university has the function of reforming social ideals,[3] of working out a social philosophy, and of training leaders for the social advance.[4] At the other end of the educational ladder, the Sunday school is called upon to become a social force by training its pupils directly in community activities.[5] The religious function of the public school can be fulfilled by fostering a general moral idealism, with specific attention to its practical social expressions.[6] In the same year in which these sentiments are heard in the Religious Education Association, a member of a committee appointed by the National Education Association to investigate and submit a tentative report on a system of teaching morals argues for recognition in the public schools of 'the religious basis on which morality rests,' and for 'formal worship once a day . . . in the schools of America.'[7]

A genuine conflict of principles developed at the International Moral Education Congress.[8] It had already appeared in articles by Professor Muirhead and Professor Dewey.[9] Muirhead argues that the unity of spiritual purpose must be restored to education. The merely naturalistic interpretation of evolution, which would subject man to nature, has not convinced the age. Rather, we think of human life from the standpoint of social solidarity, and we then look for kinship between this social product and the world that brought it forth. The history and psychology of religion, moreover, show "the essential continuity of religion with other ways of apprehending the world of

[1] See *Proceedings of the Catholic Educational Association* (1651 East Main St., Columbus, O.), particularly addresses by Thomas E. Shields, pp. 199–223, and Wm. J. Kerby and John A. Ryan, pp. 438–458.

[2] The volume for 1908 bears the title *Education and National Character* (72 East Madison St., Chicago).

[3] *Ibid.*, I. J. Peritz, pp. 118–127.

[4] *Ibid.*, F. G. Peabody, pp. 15–27.

[5] *Ibid.*, G. W. Mead, pp. 287–293.

[6] *Ibid.*, H. F. Cope, pp. 220–230; C. W. Votaw, pp. 166–170.

[7] *Proceedings of the National Education Association* for 1908 (Winona, Minn.). Address by C. W. Barnes, pp. 453–456.

[8] See J. H. Muirhead, 'The Central Problem of the International Congress on Moral Education,' *Hibbert Journal*, Jan., 1909, pp. 346–351. Cf. M. E. Sadler, 'The International Congress on Moral Education,' *International Journal of Ethics*, Jan., 1909, pp. 158–172.

[9] J. H. Muirhead, 'Religion a Necessary Constituent in all Education,' *Hibbert Journal*, Jan., 1908, pp. 343–358; John Dewey, 'Religion and our Schools,' *ibid.*, July, 1908, pp. 796–809.

finite experience."[1] Ripening of the mind to this largest meaning of life must be included in the aims of education. "In pledging itself to education of any kind, the state has pledged itself to religious education." Muirhead's suggestions as to the means of fulfilling such a function are, it must be confessed, more agreeable to English than to American traditions.

But Dewey asserts that religion conceived thus as a universal function and consciously free from supernaturalism does not yet know what it wishes to teach. Immanent in all functions of man's consciousness, it has no obvious specific function of its own. It cannot use the old symbols without confusion and insincerity. The two foci about which the higher aspirations of the age may gather without equivocation are democracy and science. When democracy is well developed, it may lead to a new birth of religion, but in its present beginnings, with the human consciousness dispersed rather than focalized, a *laissez-faire* policy is indicated, even though its adoption involves, as it must, loss of joy and consolation.

Dewey sees the practical difficulties more clearly than Muirhead. But, since we are permitted to hope for a new religion of democracy, why should not democracy, if religion is what it wants, go consciously at work toward this end? Why should religion be a mere appendage or by-product of social conditions? Is a *laissez-faire* policy, in fact, possible?

[1] In an article of my own, 'Moral and Religious Education from the Psychological Point of View' (*Religious Education*, Dec., 1908, Chicago) the position is taken that our life, as human, is a more or less conscious search for the good; that our thinking of the good goes on inevitably to the notion of unity, completeness, and permanence of the good; that our desires enlarge accordingly, and that thus morals and religion, and moral and religious education, are continuous, not discontinuous.

RECENT STUDIES ON PERIODICITY IN MENTAL DEVELOPMENT.

BY PROFESSOR WILLIAM C. BAGLEY,

University of Illinois.

From the point of view of both genetic and educational psychology, one of the most pressing problems at the present time is that which concerns the periods of mental development. It can hardly be said that the differentiation of educative methods and materials in respect to the hypothesized 'nodal-points' of mental growth is as yet anything more than experimental and tentative. In fact, educators are rather evenly divided into two groups: those who believe that mental development is marked by sharp crises or turning-points, and those who hold more closely the idea of a gradual and rather uniform growth from infancy to adulthood. Advocates of the first view naturally emphasize the differentiation of methods and materials for adolescent and preadolescent children; advocates of the latter view tend to minimize these differences.

Of the recent investigations bearing more or less directly upon this problem, those of Crampton are perhaps most significant. Crampton's work, it is true, is only indirectly psychological in its nature, and yet it promises to clear up a difficulty that has proved very troublesome to the genetic psychologist. Hitherto the description of mental development has followed the course of what Crampton terms 'chronological age.' We have thought of the child of ten as representing certain mental traits which were quite different from those represented by the child of twelve or fourteen or sixteen. And, while the possibility of variation has been admitted in theory, it has had little influence upon the distinctions that are made in educational practice. 'Chronological age' has been the standard for determining grading, school porgrams, the limits of compulsory education, and other equally vital questions.

Crampton's investigations[1] promise a far more accurate index of

[1] C. W. Crampton: 'Anatomical or Physiological Age *versus* Chronological Age,' *Ped. Sem.*, XV., 2, pp. 231–237; 'The Influence of Physiological Age upon Scholarship,' *Psych. Clinic*, I., pp. 115–120; also reports in *Physical Ed. Rev.*, 1907–8; and in *Am. Anthropologist*, October, 1905.

the degree of both mental and physical maturity than that furnished by chronological age. This index is *actual pubescence* determined by physical examination. Obviously the import of pubescence could not be determined until physical examinations had been instituted on a large scale. Now that this has been done, the correlation of the appearance of pubescent symptoms with other physical changes and with mental changes follows as a matter of course. Hall and others have prepared us in a measure for the results of these correlations, and yet the very marked differences which Crampton finds between the sexually mature and the sexually immature when the fact of maturity has thus accurately been determined indicate that even the more radical statements were scarcely overdrawn. That, age for age, the mature boys are more than 33 per cent. heavier, 10 per cent. taller, and 33 per cent. stronger than the immature boys does not surprise one so much, but the very noticeable mental inferiority of the immature boys in the high school as compared with the mature boys is something that we were not prepared for. Nor is the statement that 'earlier pubescence favors good scholarship'[1] entirely in harmony with our preconceived notions regarding the advantages of a prolonged 'period of infancy.' It is somewhat comforting to note, however, that preliminary investigations made upon children in the elementary schools give some promise that we may retain this principle in a modified form, for, with younger boys, it seems that those who are poorer in scholarship are, as a rule, *more* advanced in maturity.[2] It may well be that there is an 'optimal' age of sexual maturity, beyond which the retardation of puberty means arrested mental development, and below which premature pubescence will have a stultifying influence upon mental growth.

Crampton's further investigations will be watched with interest, for not only do they promise to establish norms and standards concerning the advent of puberty that are far more reliable than any that have hitherto been proposed, but there are indications that other criteria will be discovered which will enable us to locate definite nodal-points in preadolescent development. It will be interesting to learn whether Hall's hypothesis of an early 'transition' period, resembling adolescence in many of its characteristics, and occurring between the ages of six and eight, will find confirmation from these studies. It should not be forgotten that Crampton is in general agreement with Hall in respect of the great mental and social differences between the

[1] *Psych. Clinic*, I., p. 120.
[2] *Ped. Sem.*, XV., p. 234.

mature and the immature, and that he regards the chief conclusions of Hall's 'Adolescence' as 'beyond question.'[1]

The more specific differences between adolescents and preadolescents have been made the subject of several recent studies. Some of these, perhaps, will need new interpretation in the light of Crampton's results, but almost all of them offer something new and something tangible to our knowledge of mental growth. The much disputed theory of the relative incapacity of preadolescent children for abstract thought finds some confirmation in Miss Ellison's[2] study of children's definitions. "Such a mastery of common abstract ideas as would make possible reasonably perfect definitions is nearly or quite wanting in children of thirteen or under, though, for several years before that time the abstractions have been clearly enough grasped and the vocabulary has been large enough to allow a good deal of definition by synonyms. Still earlier the children seem to hold the idea in a distinctly concrete fashion, and to convey it, when required to do so, by means of concrete examples, while the youngest children of all in many cases cite instances of use instead of really giving the meaning of the word, possibly for the reason that, at that time, the idea cannot be brought clearly before consciousness." It would be interesting to know whether adolescent children handle abstract ideas in general more effectively, and especially whether the increase in ability to think in the abstract comes suddenly with the onset of puberty or is a gradual product of increasing experience. Studies of this sort, carried on by means of Crampton's criterion of physiological age, would do much to settle one of the most important problems in educational psychology.

Two suggestive studies of the imagination of adolescents have recently appeared. Libby,[3] in comparing two sets of themes upon the same topic, one written by fourth-year high school pupils and the other by pupils from ten to fourteen years of age, finds that the more mature productions are marked by 'greater unity, more careful explicit reference, and more careful sentence-structure.' The older pupils also show a more decided tendency toward rhythmic sentences. He concludes that the great emotional and imaginative change in adolescence comes after the age of sixteen. Brittain[4] studied the

[1] *Ped. Sem.*, XV., p. 234.

[2] Louise Ellison: 'Children's Capacity for Abstract Thought as Shown in Their Use of Language in the Definitions of Abstract Terms,' *Am. Journ. Psych.*, XIX., pp. 253–260.

[3] W. Libby: 'The Imagination of Adolescents,' *Am. Journ. Psych.*, XIX., 2, pp. 249–252.

[4] H. L. Brittain: 'A Study in Imagination,' *Ped. Sem.*, XIV., pp. 137–207.

imagination of a limited group of adolescents — nineteen boys and twenty-one girls, ranging in age from thirteen to twenty. His method of investigation is sufficiently similar to those of Lobsien and Miss Chalmers to permit some interesting comparisons of results, and, at the same time, it introduces some suggestive variations. He finds that the imaginative interests of boys are less various than those of girls, the boys emphasizing motor interests, while the interests of the girls are 'more static and emotional.' Girls undoubtedly excel in visual and auditory imagery, boys in motor imagery; the girls also excel in visual and auditory memory, but this excellence does not seem to have any necessary connection with imaginative power. In the writing of imaginative stories, boys excel girls in preserving constructive unity. Brittain believes that the differences between the sexes in imagery are to be partially explained by environmental differences, and especially by the larger opportunities that boys have for motor activity. "At least the activity of the organism, as well as its inherent constitution, seems to determine the character of its interests, which in turn determine largely the form of the imagination."

With regard to mental changes during later adolescence, the recently published study by Ruediger[1] suggests some interesting possibilities. There seems to be, in many adolescents, a rather profound intellectual awakening, which comes rather later than the more commonly observed (and perhaps more easily recalled) emotional and religious awakening. Ruediger's results indicate that this intellectual awakening occurs in most individuals after the age of eighteen. The data for the study were obtained from a selected group (teachers and graduate students), but for this group they may be taken as fairly conclusive. The study is particularly important as an example of the carefully controlled employment of the questionnaire method.

Smith's investigation[2] of pupils' voluntary reading throws some interesting side-lights upon differences between adolescent and preadolescent children. The investigations were rather extensive, taking account of 915 boys and 1,284 girls in the schools of two Iowa cities. It is rather surprising that a greater amount of voluntary reading is done by pupils of the upper grammar grades than by high school pupils. It is hardly probable, however, that this difference is due to age-characteristics; the fact is probably to be explained by the stress of home work in the

[1] W. C. Ruediger: 'The Period of Mental Reconstruction,' *Am. Journ. Psych.*, XVII., pp. 352–370.

[2] F. O. Smith: 'Pupils' Voluntary Reading,' *Ped. Sem.*, XIV., pp. 208–222.

high school which diminishes the time available for voluntary reading, and by the fact that the teachers of the upper grammar grades are possibly more expert in the formation of reading habits among their pupils than are the teachers of the high school. The results show that adventure is a leading motive in voluntary reading below the high school. Humor, pathos, and the concrete virtues are also marked in this preadolescent or early adolescent period. With the high school pupils, the reading motive is less specific. Much of the high school voluntary reading consists of light, popular fiction, which seems to indicate the dominance of the sex-instincts at this time, although the author does not mention this factor. As a practical conclusion from his study, he urges a closer correlation between high-school English and the pupils' voluntary reading, suggesting that the 'classics' be supplemented by works of a lighter and more popular character. The inevitable conflict of the widely differing types of educational value that may inhere in the study of literature is clearly shown in this suggestion. Indeed, there is a crying need in educational psychology for an investigation of the whole field of values. If literature is studied simply as a means of developing good habits of seeking diversion and amusement, the selection may well follow the lines suggested by Smith's study. If, on the other hand, high-school literature should attempt to impress upon the pupils the great ideals that are embodied in the classical masterpieces, and which it is highly improbable that the majority of pupils would adequately appreciate without the stimulus of the teacher, then another basis of selection is justified.

Some more light upon mental differences between the sexes in childhood and adolescence is furnished by Doran's study of vocabularies.[1] The method employed in these investigations is somewhat different from any that has hitherto been suggested. It consists, briefly, in having the subjects define the words appearing upon various pages of the dictionary (the pages selected by chance), computing the average for the several pages, and finally multiplying this average by the number of pages in the dictionary. From all of the previously published vocabularies of young children, Doran concludes that girls surpass boys in vocabulary up to the fifth or sixth year. His own investigations indicate, however, that, for older children and for adolescence, the male vocabulary is somewhat larger than the female vocabulary, although there are numerous exceptions to this rule. The general superiority of the male vocabulary, Doran attributes to the greater range of activity afforded to men and boys as contrasted with

[1] E. W. Doran: 'A Study of Vocabularies,' *Ped. Sem.*, XIV., pp. 402–438.

that afforded to women and girls. Although accurate correlations were not made, the author is convinced that there is a direct relation between the extent of one's vocabulary and one's general mental ability as determined by school standings. In this connection, he is in agreement with Whipple,[1] who has seriously proposed the extent of the vocabulary, measured by the 'word-building' test, as a safe and easily-applied index of general intelligence.

Our knowledge of the very early development of the vocabulary has been somewhat enriched by Cooley's intensive study[2] of the early use of 'self-words.' Cooley finds that the correct understanding of 'I' and 'you' when used by others was achieved by his own child by the middle of the nineteenth month. This, however, does not involve the same problem as the correct *use* of 'I.' Phrases containing 'I' are used imitatively long before the child feels the subjective reference of the pronoun, and this use continues long after the correct significance is acquired. This latter 'subjective' use appeared, in the case observed, early in the twenty-second month. The author believes that his child gradually came to this subjective meaning by "noticing the indications of self-feeling (the emphasis, the appropriate actions, etc.) accompanying the use of 'I,' 'me' and 'my' by others." "These indications awaken his own self-feeling, already existing in an inarticulate form. He sympathizes with them and reproduces them in his own use of these words. They come to stand for a *self-assertive feeling or attitude*, for self-will and appropriation." It is interesting to note that, in Cooley's opinion, the 'I' does not mean primarily the visible and tangible body, but rather a self-assertive feeling, linked with action. Such words as 'Baby' come into use about the same time as 'I' and mean primarily the physical body. The shadow on the wall and the reflection in the mirror play an important part here. It is noteworthy how comparatively late self-feeling seems to connect itself with these images. 'I' is a social conception from the outset in the sense that its very essence is the assertion of self-will in a social medium.

[1] G. M. Whipple: 'Vocabulary and Word-building Test,' PSYCH. REV., N. S., XV., pp. 94–105.

[2] C. H. Cooley: 'A Study of the Early Use of Self-words by a Child,' PSYCH. REV., N. S., XV., pp. 339–357.

PSYCHOLOGICAL LITERATURE.

PSYCHOLOGY OF RELIGION.

Psychologie d'une Religion. G. REVAULT D'ALLONNES. Paris, Alcan, 1908. Pp. 289.

Not the least interesting field of research for the psychology of religion is that afforded by the history of various minor sects and 'freak' religions of the present time. The actual 'facts' are usually more accessible in cases of this sort than in those of the older and more firmly established faiths. It is possible in these cases to get hold of origins and developmental tendencies that throw much light upon hoary mysteries of the older religions. The book before us is an admirable and exhaustive study of one of these modern 'freak' religions, Monodism. It originated and developed in France in the latter half of the nineteenth century and still persists in that country in a small circle of devotees.

Most of the beginnings of 'revealed' religions are so remote from us in time and so obscured by traditions as to be incapable of detailed analysis. The case of Monodism is different. We have here a small sect, most of which knew their 'Christ' personally; the original 'sacred writings' are accessible; there were disciples, prophets and all the 'experiences' of the orthodox religions materializing under our eyes, and every detail and motive can be traced in the fullest detail. Manifestly a clear understanding of the history and dynamics of the sect is of interest both to the psychologist and to the student of comparative religion. We can see here in miniature, as it were, the whole process of the origin and development of a religion of the Christian type. The value of the account here presented is much enhanced because of the thorough comparative method adopted by the author. He works out fully the analogies between this movement and others of ancient and modern times which are less accessible to scientific investigation.

Guillaume Monod, the modern French Messiah, was born in 1800, the son of a Protestant minister. He was a retiring child and throughout life was characterized by marked humility and sweetness of disposition. He received a thorough but onesided literary education, was ordained a minister at the age of twenty-four but did not obtain a

pastorate for some three years on account of some doubt as to his orthodoxy on questions such as the divinity of Christ, etc. In 1827, however, he seemed to experience a change for the better and the following year received a charge into which he entered with much evangelical enthusiasm. So great was his zeal that he got into various difficulties with local authorities and was dismissed in about a year. Soon after this, signs of mental derangement appeared and he was confined in various asylums for the insane. He had periods of excitation accompanied by delirious acts, refused food, mutilated himself, experienced hallucinations, ecstasies, mystical states and heard voices which, while at first undefined, became gradually more definite and seemed to proclaim to him that he was Christ returned to earth. In his saner moments he attempted to organize these visions and he finally built upon them a remarkable religious structure.

After four years of confinement he was released and for ten years lived in comparative retirement in Geneva where he worked and wrote to "transform his delirium into a doctrine. By reflection, by theological elaboration, by contact with men, by adjustment to social conditions, what was at first merely morbid exaltation and hallucination became little by little a defensible religion." At the end of this period he was again offered a pastorate on condition that he avoid all reference to his claim of being Christ, to which he finally agreed as also to the public burning of his writings. For the next twenty-four years he performed acceptably the ordinary duties of a Protestant pastor. His retraction was, however, not sincere. A few copies of his books were secretly saved and he said afterward that he was simply waiting, in this period of silence, for the voice of God again to order him to speak out. In 1875 he wrote that he had never for a moment, since 1833, doubted that he was the Christ. In view of this avowed belief, his long period of overt retraction and silence furnishes an interesting psychological problem into which the author enters at length. At the age of seventy-two and after many years of apparently perfect sanity the voice of God is again heard, commanding him to speak to the world of his real nature. This he did with much modesty and at first preferably only to those willing to believe in him. His propagandism finally became bolder and he defended all his claims tactfully, with the greatest skill, and by constant appeal to the Bible. He pointed out the injustice of attempting to discredit him by reference to his early mental aberration. This, he asserted, was a mere incident of his life having no connection with his conception of his character and mission.

For fourteen years he preached a gospel of singular grace and pu-

rity, not essentially different from general Protestant teachings except for the central doctrine concerning himself. A little group of believers gathered about him and a number of churches were founded in France and Switzerland. All the phenomena of prophetism, of the organization of a doctrine and the defending of it in the midst of a hostile society here occur on a small scale. The author's discussion of the various periods of the development of Monodism, of the general place of neurotic experiences in the development of religion, and the place of social conditions in the determination of the truth or falsity of a new prophet is most suggestive. As he well says, William Monod could justify himself from every point of view that the orthodox church could raise. The Scriptures furnished ample warrant for his claims. His own temporary insanity is paralleled by that of many of the prominent characters in the Bible. When his prophecies were not fulfilled he was ready to point out that a like fate befell many of the prophecies of the Bible if they were strictly interpreted. Not the least interesting phase of his teaching is his attempt to allegorize every event of his life. It is by appeal to allegory that he seeks to escape criticism on many points.

The value of this exhaustive study is greatly enhanced by a chapter on messianism, ancient and modern. In the book as a whole the theologian, sociologist, and psychologist will find much that is interesting and valuable.

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Psychological Aspects of the Welsh Revival: 1904–5. A. T. FRYER. Proc. Soc. for Psychical Research, 1907, XIX., 80–161.

The recent Welsh revival is a striking illustration of a social contagion within small and relatively circumscribed groups. While having much in common with other revivalistic phenomena, it necessarily had an individual character also. Rev. Mr. Fryer's painstaking study is a valuable addition to the literature in this field. His point of view is thoroughly scientific throughout. His own report is brief and pointed and in an appendix he gives many letters from persons who were, like himself, eyewitnesses to many of the occurrences.

Although, after the revival began, the press did much to spread it by giving vivid portrayals of occurrences in particular localities, the author believes that the most important influence in determining the growth of the revival was the general attitude of expectancy widely prevailing in certain parts of Wales then and for some years previous. In many places there had been systematic preparation by prayer for

some time and these were the places where the revival, when it came, was most intense. As he says, "If a hundred or two hundred of persons in Wales were for years desiring a particular line of action, and spent a great deal of time in expressing their desire, the force so generated and directed could hardly fail to reach and move some sympathetic minds within the same area." Although he is inclined to accept telepathic influence as a fact, it is clear that there are abundant means for accounting for many aspects of such a social movement as this without recourse to telepathy. At any rate the repeated prayers of many people created a general atmosphere of expectancy. In the meetings where there were the greatest results the people were always relatively expectant and open to suggestion.

Evan Roberts was not the cause but rather one of the moving spirits of the revival, when it had once started. From a boy he had shown a strong bias toward religion and in youth had experienced visions and ecstasies of a pronounced mystical type. In some of the nervous collapses which he underwent during the revival he was subject to various motor automatisms, such as the jerking of the head, suggestive of a nervous instability possibly connected with a severe shock received in an accident when he was a boy. In his school work as a boy he showed no more than ordinary ability and later when he decided to study for the ministry his work was so interrupted by his mystical preoccupations that he did nothing of a systematic character. He was, however, in his way a constant student of the Bible and his public utterances showed that he was saturated with its teachings although what he said was not otherwise remarkable. In the meetings he attended he always sought to get into rapport with his audience, chiefly by looking at each one fixedly for a few seconds, and he was apparently able to judge with a good deal of accuracy the person's mental condition, for after his survey of his audience he would speak to it briefly of its condition spiritually. Of course they usually expected to be correctly diagnosed, so it is not strange that they accepted whatever he said as actually true of themselves. His utterances often staggered his hearers, serving to convince them of his supernatural power. He frequently had attributed to him the gift of prophecy. His actions were governed almost entirely by an inner voice which told him when to speak, when to keep silent, whither to go, etc. On one occasion this voice suddenly commanded him to be silent for seven days, and then, as in all cases, he implicitly obeyed it. One of the most admirable characteristics displayed by him was that of modesty. He absolutely refused to be lionized.

It is of interest to note that the motive of fear played a relatively small part in this movement. The main burden of Robert's teaching was that of love and joy, so that while the influence of the revival lasted it apparently had much wholesome social influence.

Reports of all sorts of unusual experiences were rife and it is an important service this author has accomplished in giving a nearly contemporaneous record of what apparently actually occurred. It does not follow that every experience is even thus definitely ascertainable; much less may we be sure of the causes of all of them. The experiences of different persons varied widely. With some there was mere increase in bodily temperature, others had auditory hallucinations of various kinds, such as the chiming of bells, noises, and singing in the air above them. But the most curious and apparently the most commonly reported experience was that of seeing lights. These were seen by all manner of people, believers and unbelievers. The author thinks there has been much exaggeration if not actual deception in the reports, but also holds that there even yet remains a limited number of cases which deserve credence. It is a curious fact that there are many traditions of the appearance of mysterious lights in certain localities in Wales. A number of cases in recent years have been reported. With a reputation for seeing mysterious moving lights, it is not strange that many of those under the influence of the revival should have had experience in this form. It is thought that some of these lights in the past, which seem to have been especially frequent in certain localities, may have been due to incandescent vapors of some kind. Tests for atmospheric electricity made at the time of the revival yielded no result. The causes of these experiences, as far as they are genuine, were probably various. Some may have been atmospheric phenomena, others may have been simply lanterns carried along the hillsides, or railroad signals transformed by the heated imagination into preternatural occurrences. In some cases the reports of different observers vary so widely that we are driven to the conclusion that they were subject to some sort of collective hallucination. One woman prominent in the work was reported to be always attended by a light of some sort and it is interesting that some of the most striking experiences of this sort were had by persons on their way home from her meetings. Almost all who saw the lights were in strong sympathy with this woman.

This article does not deal with the moral effects of the Welsh revival. We learn from the most recent reports, however, that, since the lapse of the movement, the normal growth of the Welsh churches has been seriously interfered with and that in some cases there has been

a great falling off in membership where, previously, there had been steady growth. I. K.

The Psychological Phenomena of Christianity. G. B. CUTTEN. New York, 1908. Pp. xviii + 497.

This volume is, in the main, a descriptive account of experiences, usual and unusual, which have been at various times associated with the Christian religion. Such topics as mysticism, ecstacy, glossolalia, visions, witchcraft, asceticism, religious epidemics, faith cure, miracles, etc., are representative of the subjects treated on the pathological side, and on the other we have conversion, religion in relation to age and sex, the place of the various mental processes in the ordinary religious experience, prayer, immortality, etc.

The author has drawn from a wide range of recent literature and has massed many illustrations which are well organized and presented in a popular readable form. It is perhaps unfair to criticize the work too freely from the point of view of scientific psychology, for it is manifestly written for the general reader. The psychological point of view, as far as it is applied, is good and the interpretations of the unusual or pathological experiences of religion are such as are generally accepted, with the exception that the theory that the subconscious is a special avenue by which divine influence may penetrate the human mind, is definitely espoused at the outset, and it appears as a *deus ex machina* to assist the author over difficulties which his ordinary psychological analysis cannot penetrate. The logical confusion involved in this supposition is seldom realized by the practical religionist, and some well-known psychologists have, of course, helped to perpetuate the theory by the weight of their authority. As far as the present reviewer can see there is no reason why the psychologist should take for granted the universe of spiritual beings postulated by religion. He may well recognize that the religionist is describing some genuine element of his experience, but as far as psychology is concerned these references to a world of spiritual influences must be interpreted in terms of the rest of experience before they can enter into psychological science. Even though a spirit world, capable of interacting with that of human experience, should really exist, it is difficult to understand why its influence upon men should be supposed to be confined to only one aspect of the psychical life and that the least understood aspect.

The author's account of the mental machinery of the religious experience is the least satisfactory portion of the book. It is labored and

obscure and partakes of the metaphysics of Professor Ladd rather than of any clear-cut psychological point of view.

The book will serve to popularize many sensible explanations of religious experience, and the general reader will probably not be particular about points which trouble the conscience of the hypersensitive psychologist. The latter will not find in the book anything that is new either in point of view, method or material. I. K.

The Will to Believe as a Basis for the Defense of Religious Faith. A Critical Study. ETTIE STETTHEIMER. Archives of Philosophy, Dec., 1907. Pp. vi + 97.

The plan followed by Dr. Stettheimer is first to outline in a connected way the doctrines of Professor James, and secondly, to examine critically these doctrines. This criticism has reference more particularly to Professor James's doctrine concerning religious beliefs; "this theory is to be criticized not only for its intrinsic validity, but also, and more especially, in its character as a foundation for the defense of religious belief." The spirit of the writer cannot in fairness be said to be polemical, although some of the admirers of Professor James may be inclined at times to so believe.

The author prefaces the first task with the statement that a "connected presentation of James's theories must necessarily be more or less of a construction, for James's own work is not systematic." The exposition of Professor James's doctrine is given under two subheads: (1) The defense of religious faith; and (2) The basis of the defense of religious faith: the theory of judgment. Professor James's general philosophical position is most clearly formulated in the essay on 'The Sentiment of Rationality.' The general place of religious faith in Professor James's doctrine receives attention as well as the significance of the religious hypothesis. The author proceeds to analyze further the relation of will and belief and finds that Professor James makes the essence of belief to be manifest in the act of choice regarding those things to which we turn 'with a will.'

The critical portion of the work is contained in three chapters, the headings of which indicate the attitude of the writer. The first of these is: 'James's doctrine as a defense of religious faith at the cost of pure knowledge.' The second, 'James's doctrine as a defense of religious faith at the cost of objective reality'; and the third, 'The defense of religious belief as a vicious circle.' The writer declares that contradictory tendencies are present in Professor James's theory of the relation of will and belief. This is shown by a dual-

istic position regarding faith and knowlege in one place, while in another faith is held to be rooted in the nature of thought. This latter position, if carried out in its implication, obviously leads to the conclusion that faith bears a very clear relation to knowledge, being in fact indispensable for the seeker after truth or knowledge. This idea of the basic relation of the faith to thought is not maintained by the writer of the monograph. A third possibility is that the will is to be regarded as subordinate to the intellect, inasmuch as will is only introduced when scientific or theoretical evidence is wanting. Dr. Stettheimer does not regard this last position as fairly representative of Professor James's doctrine considered as a whole, although it is admitted that such a position is at times apparent. This last position is characterized as that of pseudo-voluntarism. Dr. Stettheimer does not believe that Professor James is to be classed in the movement represented by the names of Hume, Kant, Fichte, Carlyle, and Paulsen.

Professor James wavers between the two different positions indicated above, and the broad charge is made that in defending religious belief in the manner in which he does he thereby 'sacrifices the possibility of knowledge.' The overcoming of the difference between faith and knowledge is accomplished at the cost of knowledge, or else the duality is not superceded. If knowledge and faith are coördinated, then religious beliefs are objects of faith which cannot be affirmed as real by the judgment, or if these are affirmed by the judgment then such an affirmation is a debasement of that currency of judgment which would have knowledge related to objective reality in order to be true. Dr. Stettheimer holds that a charge of subjectivism cannot be sustained against Professor James, but maintains that reality for Professor James is what is willed and affirmed, since no fact becomes real until such volitional affirmation is made as relates this to one's self. If objective reality exists independent of the subject, an attitude that belief in the truth of a judgment is influenced volitionally could only be an attitude wherein we will to deceive ourselves.

Dr. Stettheimer concludes that Professor James is not successful in supplying a justification for religious faith, for faith and knowledge are not harmoniously related. The reason for this lies in the fact that the mental state characterized by belief in the one case is not of the same kind as the state of belief when related to judgment. Professor James's error here is apparently due to his notion of freedom. The implication of determination which is present in what is designated as free belief, whereby belief does not originate reality but is only concerned in its cognition, results in a deception of one's self concerning what is believed.

The question is pertinent whether Dr. Stettheimer has correctly interpreted Professor James at all points. The writer's failure to do so may be due to the fact that Professor James's views change somewhat in the course of his writing — a fact not peculiar by any means to him but found in other writers, as Kant, for instance.

Those who read this book will probably fall into two classes in their estimation of it. The followers of Professor James will hardly believe that Dr. Stettheimer has done full justice to their author; and those who have little sympathy with Professor James's doctrine will find in Dr. Stettheimer's examination and criticism a welcome confirmation of their own views. It may be asked whether it is not possible to find a certain intermediate ground where it is not necessary to reject Professor James's doctrine of defense of faith and religious beliefs because this defense is purchased at the cost of pure knowledge and objective reality. That is, is it not possible to find a position which, while maintaining the integrity of pure knowledge and an objective and universal reality, can also admit the relevancy of faith and religious beliefs? The reviewer believes that this is not impossible.

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INDIVIDUAL PSYCHOLOGY.

Das Problem einer Charakterologie. EMIL LUCKA. Arch. f. d. ges. Psych., 1907, XI., 210–240.

Lucka divides his paper into four parts. The first part, the special psychology, is chiefly a criticism of the existing systems of differential psychology. Lucka holds that a special psychology or characterology must take the individual consciousness as a functioning organism, and must search for a basal function. All mental phenomena must be considered as a branching out of this basal function and they can be separated only by abstraction. Both the German and the American-French school of differential psychology have failed to do this. They have searched for coördinated elements instead of a basal principle. These they have attempted to fix by arbitrarily chosen mental tests, which Lucka thinks can at best give only a psychometrics, but never a psychology. No attempt is made to show a necessary relation between the elements discovered by the tests. Finally, they are satisfied with a cross-section of the psychic, neglecting the genesis entirely.

In the second part the author gives what he thinks the two aims of a characterology. The first task is to examine all the ramifications of the concrete psychic life. The second task is the classification of

everything special in the individual into his total consciousness, and then of the special individual in his place in the universal human.

The third part gives the methods of a characterology. The first aim is to see the psychic life in its whole complexity. Life may be studied in biography, reports of ethnology, results of folk psychology, in the psychological analyses of our great poets, etc., above all however by direct observation, provided the observer has the faculty of sympathetic insight. Experiment might be valuable, but until now it has failed to bring useful results. Lucka recognizes the difficulty of this method, as it requires a peculiar faculty on the part of the observer, and because no degree of exactness can be reached through it.

In the last part the author gives a brief sketch for the founding of a systematic characterology.

Consciousness draws all its material from the objective world, but the individual mind determines what is taken, in what form it is taken, with what intensity the new is assimilated with the already existing, and finally what further becomes of the contents thus taken in the individual consciousness. These must always be functional movements as the content of consciousness grows out of functions.

The inner structure of the concrete consciousness reveals itself in every act (*a*) by its position to the environment, (*b*) by the inner psychic processes. The horizontal organization, showing what relation the individual consciousness can take to the environment and to its own content, gives two possibilities: (1) The relation may be direct, the reaction following the stimulus without being consciously affected by the other contents of consciousness; (2) the relation may be mediate. Here reflexion is placed between stimulus and reaction. The individual has contents and, besides that, he knows that he has them and how he has them.

The vertical organization shows what becomes of the material thus taken in the interweaving of the concrete consciousness. The degree of intensity of a subjective reality lies in the degree of independence from the data of the environment. The man who always acts on the spur of the moment is the lowest form of the reproductive type. He reproduces the content as well as the form of all impressions. On the other end of the scale is the man of the producing type. For him impressions are only raw material for new contents. The quantitative measure of the individual psychic value is the predominance of the power of reshaping over the power of merely preserving. The two basal functions of consciousness are memory and imagination, corresponding to the opposites, learning and experience.

In experience (Erlebnis) Lucka believes to have found the basal function domineering all other functions of the psychic life.

Character, from the functional side, is the disposition of the individual psychic organization to take impressions of the environments in a specific manner and to react upon them in a specific way, *i. e.*, the characteristic relation to the environment. Now there are two possible relations: (1) The contents of the individual consciousness may be residues of previously experienced stimulations; or (2) everything taken by the consciousness may only be the raw material for new contents. This peculiar power to create new contents is to experience, and a person possessing this power is a personality. Personality, the I or the soul, is the inner organization, one might say the *a priori* element, a function free of all material. Form is given to personality by contents coming from the external world.

In this basal function Lucka believes to have found the explanation and the basal principle for a differentiation and a classification of an individual consciousness. Through it, he believes, it is possible to reveal the innermost nature of man, his relation to the external world and his position to the general culture value.

UNIVERSITY OF MISSOURI. SAMUEL A. KRUSÉ.

SUPERSTITION.

Superstition and Education: FLETCHER BASCOM DRESSLAR. University of California Publications, Vol. V., No. I., 1907, pp. 1–239.

This extensive investigation 'has to do with that mental tendency in humanity which finds satisfaction in retaining superstitions and in believing in them.' The material for the study was collected from normal-school students in California, the method employed precluding the possibility of suggestion. Students were asked to write all the superstitions they knew, and to indicate their attitude toward them by 'belief,' 'no belief,' or 'partial belief.' In all, 7,146 separate reports of superstitions were thus obtained from 875 persons, mostly young women. Of the 7,146, 44.9 per cent. were expressions of 'belief' or 'partial belief.' *Almost every person believed in at least one superstition.* Considering the source of the material, the extent of belief in superstitions is astonishing, and educationally discouraging.

The author employs *superstition* in the sense of an instinctive desire to believe in causal relations that cannot be proved to exist. Superstition exemplifies the tendency of the mind to an inertness which results in over-ready generalization, extreme respect for tradition, and

the choice of the line of least resistance. The tendency has also an emotional basis, largely in fear.

Superstitions have served various purposes. They have been used to frighten children into behavior according to the dominant social and ethical ideals; as pedagogic devices to train people into habits of economy; for their therapeutic value in the treatment of diseases (effect of suggestion); and as a means of relieving the mind from its indecision. The author considers the last use so important as to constitute almost a 'hygienic necessity' for superstition.

Belief in luck superstitions is higher than for superstitions in general; and because it tends to discourage effort it is deemed specially harmful. Good-luck superstitions are less frequent than those portending bad luck; hence we seem more fearful than hopeful.

An ingenious and (for the reviewer) novel theory is advanced to explain the well-known mental preference for odd numbers. According to the author it grows out of our preference for balance, or equilibrium, which of course is more appropriately symbolized by the odd than by the even numbers.

The study forcibly evidences the primitive notions of cause and effect among the masses of people, and shows that we have not progressed altogether beyond the pale of primitive animism. Since superstitions have their seat so largely in the emotions they are difficult to reach. No system of education can reasonably hope to reconstruct humanity and free us from superstition in a decade, or even a century. Education can, however, avail something by paying greater heed to the culture of the emotions, by avoiding the improper use of myths in the early years, by manual or industrial training and other use of the *realities*, and by constant watchfulness on the part of the teachers in fostering the scientific attitude.

It needs hardly to be said that so careful and extensive a study as this one represents a valuable contribution to psychological as well as to ethnological and educational literature. If the reviewer were allowed one word of criticism, it would be to the effect that the study as made fails to unearth some of the most deep-seated and dynamic superstitions which afflict humanity — those pertaining to crude forms of religious belief. For example, the belief that prayer may influence weather or other natural phenomena has no more basis in scientific fact than the emptiest 'wish superstition' enumerated by Professor Dresslar: yet the countless superstitions of this character were naturally not included in the lists reported. That is to say, *only such beliefs as have become generally subject to more or less doubt were men-*

tioned as superstitions. These represent in their very essence a weakened condition of belief, and so must be relatively unimportant in their influence on behavior. The most real, abiding, and influential superstitions — those with which it is most important for education to grapple — are not touched upon in this study.

Other subjects treated besides those already mentioned are Charms and Cures, Animals in Superstitious Lore, the Most Common Superstitions, 'Over the Left,' Wishing, Remembering Superstitions, etc.

LEWIS M. TERMAN.

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EDUCATION.

Experimentelle Didaktik, ihre Grundlegung mit besonderer Rücksicht auf Muskelsinn, Wille und Tat. W. A. LAY. Leipzig, Nemnich, 1905. Pp. xxi + 595.

Lay's Experimentelle Didaktik may be said to derive its special importance from two facts: first, the entire work treats pedagogy by the experimental method; secondly, the author emphasizes throughout the book the importance of motor education, holding that the realization of the principle involved will transform instruction which is passive and static into that which is active and dynamic.

Dr. Lay first considers the muscle sense. After disproving the formerly widespread view of an 'innervation sense,' he shows that the muscle sense includes not only muscular sensations but the total complex of sensations resulting from the movement or position of any part of the body. These sensations belong to the sense of touch, are hence not of central but peripheral nature, and form varied complexes out of the sensation of the joints, tendons, ligaments, muscles and skin. These sensations form an important element in the new psychology. "No perception without movement of the sense organs: no sensation, no idea, no feeling, no willing without motor sensations and motor images." In treating of the motor development in childhood, he discusses spontaneous, reflex, instinctive, and voluntary movements, their order of development, and their fundamental importance in the development of the senses and the mental life of the child. He shows experimentally the importance of motor images in drawing, demonstrating that form is conceived more easily, clearly, surely, and lastingly if the pupil receives sensations of movement and touch as well as light. In the discussion of the instinctive and play activities of the child, it is shown that their activity leads not merely to the perfection of physical dexterity, control, and carriage of the entire body, but con-

tributes to the development of the senses, of attention, of perseverance and courage in action, of feeling, furnishes an extremely valuable experience of the relation of cause and effect, and supplies the imagination with rich and abundant material.

Feeling, attention, association and assimilation, objective and verbal instruction, imagination, thinking, suggestion, practice and memory, learning, and habit are taken up in turn; in all of these the psychology of movement, in which muscle sense and motor images play the chief parts, is clearly brought out and its pedagogical value indicated. Attention, *e. g.*, is essentially a complex of motor elements. The primary causes of attentions are instincts and impulses; intensive sense impression, strong feeling, power of habit are but secondary, depending on the former. Attention means concentration; distraction means diffusion of movements.

In the discussion of objective and verbal instruction, the author emphasizes the former, contending that all other instruction must be joined to this, and that consequently foreign language instruction must not expand to such an extent that objective instruction as a main branch is interfered with.

Dr. Lay's more important experiments pertain to perceptual types and periodicity. From the first the conclusion is reached that in orthography the visual element predominates over the acoustic and the motor considerably over both. It is not true that most people are auditory-minded, as many psychologists believe. Lay found that in spelling and arithmetic (number) motor images of speech assumed a very important place with all pupils; all pupils are speech-motor, but not all are graphic-motor. "There are no perceptual types in the sense that word images and number images consist only in sound pictures or written pictures, or in speech-motor, or writing-motor images; but it is well to distinguish auditory, visual, and motor types in the sense that one predominates, and alone or in connection with certain others produces the best results in perceiving and remembering."

As to periodicity, exhaustive experiments showed that all pupils have a fixed psychic rhythm and a fixed psychical energy peculiar to themselves; both are subject to hourly, daily, weekly, monthly and most likely yearly fluctuations. The psychic energy of each pupil moves up and down in waves during the day, in a manner peculiar to himself, reaching two high points, one in the forenoon and one in the afternoon. The daily maximum of psychic energy is reached with many pupils during the forenoon, often during the afternoon, but seldom at night.

A résumé of the studies of fatigue of school children is given and the conclusion reached that the school system, at least in Germany, is radically wrong, and that the demand of the higher schools leads to overburdening in home study.

The latter part of the book deals with a discussion of the will. This is of a philosophical nature, tending to further establish his fundamental principle, the sensory-motor process. "Every psychical process is sensory-motor, for every conscious occurrence there are motor processes, motor sensations, motor images and muscle movements; a strict separation of intellect and will is impossible and has proved harmful many times in the theory and practice of pedagogy."

A. W. WEBER.

UNIVERSITY OF WISCONSIN.

Comment former un esprit. DR. TOULOUSE. Paris, Librairie Hachette et Cie. Pp. x + 255.

This little volume contains a series of ten lessons of a popular character for educators, in which the author sums up that which his experience of psychology and medicine emphasizes as of decisive value in the culture of the mind. He proceeds from the familiar point of view that education is not the mere possession of knowledge but a forming of the mind so as to effect an adaptation to the conditions of life. The acquisition of facts, to be sure, is a partial means to this end, yet there is nothing eternally fixed about facts, and hence from the point of view of mental formation the process of acquiring is more to be desired than the accomplishment. Since observation and judgment are means by which facts are gained, a discussion of how to perform these functions is embodied in distinct chapters. The points brought out in this discussion, as well as in the subsequent chapters on 'How to think' and 'How to act,' are worn by much use. They are attractively written, however, and possess a considerable value for the general reader, especially as far as the author has set forth in them the bearing of the emotional life upon thinking and acting.

Following these are two chapters which deal respectively with the art of living with others and that of being one's self and thus effecting an economy of effort.

That chapter, however, which deals with the principles of sexual morals will be found most provocative of thought on the part of the professional educator. From the point of view of morals and of health instruction in sexual matters should be afforded to every child. The informatiou imparted must be of a definite character, so that the child

shall know exactly what we are talking about. This is especially a problem for parents, but teachers cannot escape their responsibility.

The volume concludes with a series of brief suggestive essays on 'Backward children,' 'Youth,' 'The need of work,' — in which work is represented as a physiological necessity, and the need of it as a variable with our powers, — 'Repose,' 'The secret chapter' and 'The crisis,' — in both of which the marriage relation is under discussion, — and last of all 'The sense of life,' a happy little essay which contains a good deal of the philosophy of a successful life. 'What is it worth ?' is a question which must insistently be asked when we contemplate either work or diversion; and our occupations as well as our avocations should stand or fall according to our sober response to that question.

ROBERT H. GAULT.

WASHINGTON COLLEGE, MD.

PAIN SENSE.

Psycho-physiologie de la douleur. I. IOTEYKO et M. STEFANOWSKA. Paris, Alcan, 1909. Pp. 251.

Distinguishing between 'physical' and 'moral' pain, and in the former between the sensation and its disagreeableness, the authors of this book have brought together a large number of the facts and opinions which the investigations of recent years have developed with regard to the difficult problem of physical pain, and have made use of them as argument and evidence for the general conclusion that pain is a sensation due to the stimulation of special organs, the modification of which is transmitted by special paths of conduction to a special pain center in the cortex. All the main facts and considerations bearing on this conclusion may be found more concisely expressed in an article of thirty pages by E. Wertheimer ('La douleur et les nerfs dolorifiques,' *L'Année Psychologique*, 1907, pp. 370–399). Our authors, however, make several original contributions to the theory. They discover, *e. g.*, that menthol allays pain before arousing the sensation of cold, indicating, it is argued (p. 118), direct action of the menthol on pain nerves (but no account appears to have been taken of the possible influence of 'suggestion'). They find, further (p. 62), that people generally, both the right-handed and the left-handed, are more sensitive to pain on the left side, in the proportion, namely, of 10 to 9, and they conclude from this (p. 101 f.) that there is a special center for pain distinct from the other sense-centers, — an inference which, as Wertheimer remarks, seems to rest on a foundation somewhat preca-

rious. But the most notable contribution to the theory is the argument of I. Ioteyko (pp. 191 ff.) for the view that pain is excited by specific algogenic substances generated at the moment of strong stimulation. The argument rests partly on analogy, — the pains of inflammation and those due to injected poisons, *e. g.*, may plausibly be referred to the irritation of toxins; partly on certain peculiarities of pain, such as its relatively tardy appearance, its persistence and irradiation and its evocation by summation of stimuli, which the theory explains better, it is claimed, than any other. The theory rests on the view that pain is a function of the intensity of the stimulus (p. 45), but the conception of strong stimulation is clearly relative, since the threshold of pain, while generally higher, can, according to v. Frey, in certain regions be even much lower than that of pressure (p. 78). Specific algogenic substances have not yet been discovered, but the theory is sufficiently interesting and plausible to serve as a working hypothesis. It may not be out of place to remark, since the fact could hardly be inferred from the book, that a toxic theory of pain is not altogether new. It was favored, *e. g.*, by Ribot in 1896 (*Psych. des Sent.*, p. 41), following the still earlier indications of Oppenheimer, and in the same year in which our author published her paper on *Les substances algogènes* by Lagerborg (*Gefühlsproblem*, 1905, p. 100).

Of the literary conscience that has gone into the composition of this work, the less said perhaps the better. There are eight pages of bibliography, which contain many valuable titles, but they are not placed in any exact alphabetical order and the list is woefully incomplete. Not only could works not noticed by our authors be easily added, but certainly more than a score of writers mentioned in the text, some of them quoted at length, do not appear in it at all (Georget, Blocq, Moebius, Sollier, Bertholet,Gerdy, Landry, Larget, Dastre, Colucci, Le Brun, Murray, Wundt, etc.). This is the more deplorable because titles are almost entirely absent from the body of the text, and never by any chance through the entire work is there a single precise reference by chapter and page. A number of names are habitually misspelled; *e. g.*, Sherrington, Scherrington (pp. 177, 243), Krause, Krauze (pp. 81, 176), v. Tschisch (p. 244), Tschich (p. 42), Tchich (pp. 168, 226), Tschitch (p. 200). But still worse must be said: these writers, namely, have not hesitated, and that not once, but repeatedly, to transcribe whole passages from their authorities without the slightest indication by reference or quotation marks of their indebtedness. Thus on p. 7 and the following there are actually five pages of direct quotation from Beaunis's *Sensations internes*, pp. 225 ff., with omissions

and the slight change from the first person to the third; on pp. 14–18 there is similar cribbing from Dumont's *Théorie scientifique de la sensibilité*, pp. 64 f., 80, 83 and 140 f.; on p. 177 f. more than a page is appropriated from Wertheimer's article, p. 373 f. How far this method of book-making has been followed, it would be hard, in the absence of direct references, to say; but evidently the authors have not yet freed themselves from the vicious undergraduate practice of copying into note-books extracts and abstracts and then writing them out formally, without proper citation or reference, under selected headings. This method may be pardonable in undergraduates, but it is simply inexcusable in work that claims serious scientific recognition. It is to be hoped that the authors' experimental work shows a greater regard to accuracy.

H. N. GARDINER.

SMITH COLLEGE.

ORGANIC SENSE.

Organic Sensations and Organismic Feeling. THOMAS P. BAILEY. J. of Philos., etc., 1908, V., 406–412.

The author describes in some detail a state of merriment followed by one of indignation. The first is characterized as one of 'diffused suffusion'; "a sort of gentle, twittering, ticklish, vibrating glow possesses me." The second mood is described as an "'all-over feeling' of tension, which *seems to be spreading* to particular muscles. . . ." 'Faint twitters and spasmodic quivers' remain. "The internal sensations seem to be supersensitive, but are now rather acute than massive, more definitely localizable, and less indicative of an 'organismic' reaction."

The first mood is affective, the second muscular and emotional. The contrast appears between the "external and internal *sensation* of 'tickling'" of the second mood, and "the attitude or affective mood of 'ticklishness'" of the first. An abortive attack of influenza in the afternoon of the same day gave Bailey proof that the peripheral nerve extremities were hyperæsthetic. The relations of sensation, relation (association), and impulse in the two directions, quality and intensity, determine the attitude. 'Organismic' sensations, the affections, originate in 'diffused' organic sensations. "When 'quality' is in the functional foreground we have sensation-in-time-and-space perception; when 'intensity' is dominant, we get 'feeling,' which may take either an impulsive or a relational direction.

CLARENCE S. YOAKUM.

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DISCUSSION AND REPORTS.

NOTE ON SOME DIFFERENCES BETWEEN 'SAVAGES' AND CHILDREN.

Many biologists and psychologists and some anthropologists and ethnologists seem to have accepted the 'parallel of the child and the race' as signifying an almost absolute identity of action and of thoughts between the child and primitive man, wherever such identity is physically or psychically possible. For such theorists the common sayings, 'all savages are children,' and 'children are little savages,' are understood with surprising literalness, not to say dogmatism. But even where parallelisms and identities of a recapitulatory sort may reasonably be expected, there do exist sometimes between the child and the 'savage' differences in actions and in thoughts that are very characteristic and of no little significance for the student of the evolution of the individual and the race.

Some interesting examples of such differences are to be found in methods or systems of counting and their representation in sign-language, etc. Father Joseph Meier,[1] in his discussion of the numerals in the Moanus language, of the Admiralty Islands, part of the Bismarck Achipelago, northeast of New Guinea, calls attention to the words for 7, 8 and 9 and their representation in sign-language. In the Moanus tongue there are separate and distinct terms for the numerals from one to six, but the next three following are, respectively, *andra*-tálo, *andra*-ruo, *andra*-si, literally 'yet three,' 'yet two,' 'yet one,'— the idea being that when we have 7, it is 'still 3 to 10.' In order to represent 7 with his fingers the Moanus native will show the closed fist of one hand, with three fingers of the other hand outstretched; for 8 one fist closed, with two fingers of the other hand outstretched; for 9 one fist closed, with the thumb of the other hand outstretched.

Thus, when a Moanus native wishes to express seven in sign-language, he bends down seven fingers and stretches out three, whereas the European or American child would stretch out seven fingers to convey the same idea. Moreover, with our children one finger is *stretched out* for each unit, while with the Moanus Islanders for each unit one is *bent down;* with the former six is represented by the fingers of one hand and one of those of the other outstretched, with the

[1] Meier, Joseph. Berichtigungen zu Dr. Schnee's Mitteilungen über die Sprache der Moánus, Admiralitäts-Inseln. *Anthropos*, Vol. I., 1906, pp. 210–228, 472–482.

latter by one closed hand and the thumb of the other bent down and brought close to it. Here we have a distinct difference in the method of indicating units, as well as an equally marked one in the expression of the numbers 7, 8 and 9 in sign-language.

Another interesting fact is recorded by Mr. F. H. Cushing,[1] the eminent ethnologist, who possessed such an intimate acquaintance with the Zuñi Indians. Following is his experience in his own words (p. 313): "I was not a little astonished to find that the Zuñis did not consider the two hands held up apart as meaning ten. I can illustrate this and its cause by my first experience of it as a Zuñi. Whilst I was serving an apprenticeship with the chief silversmith of Zuñi, in 1881, he asked me one day how many li-a-li-we (silver bits or dimes) I had. As my mouth was full of buttons, I held up both hands spread out and apart, to assure him that I had *ten* ten-cent pieces. 'Alas, son!' said he, 'I already have *two half-dollars*, but I was hoping you had ten-cent pieces enough to exchange for them.' 'But I have,' said I, ejecting the buttons and resuming speech in my surprise; whereupon he laughed at my having *split* the sign for ten, making it two fives, which he had interpreted as meaning two half-dollars."

A child of the white race would have interpreted the two-hand gesture as the adult Cushing did, not thinking it could signify 'two fives apart or separately,' but merely 'two fives together,' *i. e.*, 'ten.' The Zuñi word for ten, *as-tem-'thla*, signifies literally 'all of the fingers,' being derived from *as-si*, 'fingers together (or as one),' and *tem-'thla*, 'all.' The gesture for 'ten' in Zuñi is the two hands (with fingers close together in each) held up with thumbs crossed, or the same sign with the fingers of each hand bent on the palm. This is not a gesture which a child of our race would naturally make for 'ten,' though the knuckling down of the fingers might not be unknown to him.

The following experience of Dr. Dixon and Dr. Kroeber[2] among the Yuki Indians of California deserves citation here:

"The old man from whom the numerals were mainly obtained was asked if he knew how many fingers he had. He answered, without hesitation, *hutcamopesul*, ten. He was asked how many fingers and toes he had, and said he did not know. Two pairs of hands were spread out on the ground in front of him, and he was asked

[1] Cushing, F. H. Manual Concepts: A Study of the Influence of Hand-Usage upon Culture-Growth. *American Anthropologist*, Vol. V., 1892, pp. 289–317.

[2] Dixon, R. B., and Kroeber, A. L. Numeral Systems of the Languages of California. *American Anthropologist*, N. S., Vol. IX., 1907, pp. 663–690.

to count the fingers on them. He proceeded to push the fingers aside one by one, grouping them by fours and pausing after eight and sixteen. One thumb having been overlooked, he made the total *molmihuipoi*, nineteen, and announced that as the result" (p. 668). The authors remark concerning this interesting experiment:

"This incident is told, not to show the feeble arithmetical powers of the Yuki, for the old man's error was due, no doubt, to his being unaccustomed to count other people's fingers, and, had he been allowed to operate, as habitually, with sticks, the mistake would probably not have occurred; but to illustrate how completely this system, many of whose terms do have reference to the fingers, departs from the common primitive quinary-vigesimal finger-and-toe counting methods, and is purely quaternary. It does not follow that because people count by their fingers they count by fives."

Here is an experimental demonstration of the fact that people who count by fingers do not necessarily count by fives. And in other things than counting corresponding facts doubtless occur, which destroy some of the other dogmatic statements found in certain text-books.

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MEETING OF THE NORTH CENTRAL ASSOCIATION OF TEACHERS OF PSYCHOLOGY.

FROM A REPORT OF THE SECRETARY.

A meeting of the North Central Association of Teachers of Psychology in Normal Schools and Colleges was held at the University of Chicago, April 3, 1909. The sessions were held in Emmons Blaine Hall, the School of Education. About fifty teachers of psychology from normal schools and colleges in seven of the North Central States were in attendance.

The majority of the papers and discussions centered about the teaching of the elementary course in psychology, and though characterized by much individual divergence of theory and practice tended to favor the further use of experimental methods and exercises and the introduction of more data from social psychology.

Professor Seashore in his paper entitled 'A Written Recitation and a Class Experiment,' explained a method of conducting a written recitation by which large classes may be handled: (1) Every individual student shall take active and responsible part in the experiment; (2) the experiment shall be sufficiently intensive to make it vital, and (3)

each step in the experiment shall be explained and interpreted in a printed leaflet. It was recommended that psychologists coöperate in producing a series of such experiments.

Two distinct if not opposed types of social psychology were represented in the papers by Mr. Ernest Talbert and Professor Charles H. Judd. Mr. Talbert urged in his paper on the 'Value of Social Psychology' that an adequate social psychology must proceed from the analysis of fundamental instincts, 'dispositions' and sentiments, showing how they work out in the life of groups. For college students the study of social psychology has some points of advantage over the conventional treatment of individual psychology. A discussion of public opinion, instincts and their working, suggestibility, the mob, custom, conventionality, the imitation cycle theory, etc., with reference to and criticism of representative writers (Wundt, Tarde, Baldwin, Ross and McDougall) gives the introspective practice of 'pure' psychology, combined with a measure of objectivity and an appreciation of the relation of the individual to the group. It creates a sense of the importance of the education process as the technique of carrying over the psychical inheritance from generation to generation.

Professor Judd in his address on Social Psychology criticized the type of social psychology represented in the writings of McDougall, Ross and Sumner, in so far as it assumes social instincts, impulses, emotions, suggestibility, imitation to be the chief data of the science, and fails to recognize the transforming and controlling social influence of the evolution of systems of ideas.

The use of tools is a line of mental development which can be clearly traced. The earliest tools were made in a purely imitative way, because the range of comprehension of primitive man was limited. As the ability to concentrate attention upon material and upon principles of construction grew, the complexity of the tool also increased and a complexity of the process of manipulation reached the stage which appears in modern industrial life.

Such examples make it clear that a principle of evoluton different from that of the biological sciences is necessary to account for human progress. The higher forms of intelligence are distinct factors in the forms of evolution. The ability to have ideas and to enlarge upon them is a distinctive human trait which the animals do not possess. The recognition of an intellectual type of evolution gives to educational practice a larger foundation.

Professor J. R. Angell read a paper on 'Conflicting Ideals in the Teaching of Psychology,' which will be published in the *Educational*

Bi-Monthly. The program also included papers on 'A Way of Simplifying the Introductory Course in Psychology,' by Mr. Rowland Haynes; 'A Device by which Physiological Concepts may be Employed in Teaching Psychological Processes,' by Dr. N. A. Harvey; 'Teaching the Organic Conception in the Introductory Course,' by J. B. Miner; and 'A Course of Applied Psychology for School Teachers,' by Mr. Frank G. Bruner.

Professor E. J. Swift gave an account of 'Relearning a Skillful Act: An Experimental Study in Neuro-Muscular Memory.'

NOTES AND NEWS.

AMONG the delegates to the Darwin celebration in Cambridge, June 21–24, we notice the following who are especially interested in psychology: President Schurman, representing Cornell University; Professor C. S. Minot, representing the Boston Society of Natural History; Professor J. Loeb, representing the University of California; and Professor Baldwin, representing the Johns Hopkins University and the Government of Mexico.

THE forty-seventh annual convention of the National Education Association will be held in Denver, July 3–9.

WE note with regret the deaths of S. S. Laurie and Hutchinson Stirling, both of Edinburgh, and of F. S. Rauh, of Paris.

PROFESSOR ROBERT H. GAULT, of Washington College (Md.), has been appointed to a chair in psychology at Northwestern University.

PROFESSOR MAX MEYER, of the University of Missouri, has gone for a year's stay in Europe, on leave of absence.

THROUGH an error of the translator the title of Professor Beauvisage was rendered *Père* Beauvisage in Dr. Philippe's article in our March issue (Vol. VI., p. 89, line 3).

DURING Professor Baldwin's absence in Europe during the coming academic year, all MSS., books, communications, etc., relative to the REVIEW proper, should be sent to Professor J. B. Watson, Johns Hopkins University. Professor Watson becomes, from now on, one of the Editors of this REVIEW.

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THE

PSYCHOLOGICAL BULLETIN

HOMOGENEOUS CONTENT IN THE MEASUREMENT OF CONTINUOUS MEMORY PROCESSES.[1]

BY PROFESSOR CARL E. SEASHORE,

State University of Iowa.

Experimental pedagogy has not yet found itself. Here and there a crumb, the by-product of a theoretical investigation in psychology, has been proffered only to be lost in the scramble for its absorption. Of the few investigations which have been undertaken from the avowedly pedagogical point of view in experiment some are of questionable scientific value because the experimenter had only a superficial view of the elements in his problem, and others have failed because an unreliable psychological method was used.

To experiment in psychological pedagogy, the experimenter must first of all have psychological technique in hand. As experiment in psychology had to wait for the development of experiment in physics, chemistry, and biology, so education has to wait upon the development of experiment in psychology. Experiments in pedagogy must be conducted with a psychological technique. The psychological laboratory should furnish the pedagogical laboratory with methods and tested apparatus. In this respect, the relation of education to psychology is analogous to the relation of psychology to physics. So far as possible, the psychologist draws upon physics for the physical principles which enter into the control of his stimuli and measuring apparatus; and the educator should draw upon psychology for the psychological principles and aids which come into operation in his experiments.

The recognition of this is the first step out of the haphazard, hit-and-miss procedure of experiment in education. I would not for a

[1] Read in the joint session of the Am. Psych. Association and Section L of the A. A. A. A. in Baltimore, December 31, 1908.

moment belittle the simple direct observation which does not deserve the name of experiment but leads to insight. My contention is that the development of a successful psychological method is enough of an object in itself and the solution of a pedagogical problem is enough of an object in itself. If we take the two together we have two variables. The American Association stands for the principle of taking only one variable at a time, and Education is to be congratulated on being put upon the same basis as the other sciences in this respect.

Only a very small number of the astronomers who rise above our intellectual horizon are called upon to invent telescopes and tables of logarithms. But, of course, the educator to-day puts the beseeching question to the psychologist — where are your telescopes and where are your logarithms? And the psychologist replies, "Come over to Damascus and help us."

In accordance with this attitude, I have chosen to speak of something which is not new, but rather something on which I can speak from conservative experience. In my work on a method of measuring mental work, published eight years ago,[1] in Miss Kent's and my work on periodicity in mental work,[2] published three years ago, and in Dr. Fracker's recent work on the transference of training in memory,[3] as well as in a lot of minor researches, there has gradually developed in my laboratory a method, or a system of methods, of using homogeneous content in long protracted memory tests. It is not newness, nor is it originality that justifies my speaking of this question, but rather the feeling that this method is eminently serviceable and should replace some of the cruder methods which are still in vogue. Homogeneous sensory stimuli have, of course, been in use by many others.

For rough purposes it may suffice to know that John can commit to memory a piece of poetry in two minutes, William in three and Peter in ten. But the real questions are, how did each one proceed with reference to imagery, associations, span of attention, order of repetition, special clues, memory aids, etc.? Wherein does the advantage of one procedure over another lie? What is the nature of Peter's handicap? What specific deductions may we make with reference to the improvement of nameable factors in the process?

Such memory contents as poetry, prose, numbers, nonsense sylla-

[1] Seashore, 'A Method of Measuring Mental Work: The Psychergograph,' *Univ. of Iowa Stud. in Psychol.*, III., 1–16.

[2] Seashore and Kent: 'Periodicity and Progressive Change in Continuous Mental Work,' *Univ. of Iowa Stud. in Psychol.*, IV., 46–102.

[3] Fracker: 'On the Transference of Training in Memory,' *Univ. of Iowa Stud. in Psychol.*, V., 56–102.

bles, etc., do not answer the purpose. They cannot furnish homogeneous units. They involve distracting associations. Their only unity is in the continuity of flux. Only the gross total can be measured. There can be no fractionating of introspection. We cannot know what we are dealing with. Yet such memory contents seem to enjoy the sanction of good patronage.

To experiment seriously on memory, we must keep in mind the elements of the process — impression, retention, reproduction, and association — and control these so that we may repeat and describe each one. We must know the content and the magnitude of the impression, the duration and the degree of retention, the manner and the conditions of the reproduction, and the types of association. This can be done only if we use simple and homogeneous content or objects.

I commend a plan that answers this purpose. It enables us to take simple and homogeneous memory objects from any sense, and from any particular attribute within each sense, and to continue with the same material for any desired length of time, — hours, days or weeks.

Let me illustrate it in a simple form. Suppose that we take for our memory objects four tones which differ in pitch only, *e. g.*, the individual tones in the major chord. These may be struck upon the piano, following the beat of a metronome, at the rate of one tone per second in any one of twenty-two different orders, for example, *e*, *c*, *g*, *c'*; *g*, *e*, *c'*, *c*; etc. The impression thus takes four seconds. The next four seconds are allowed for reproduction. This is continued indefinitely — four seconds for impression and four for reproduction. In the reproduction, the observer is required to give the order of the tones in the last group *but one*. This gives a specific period for retention of a clearly definable content: one group has to be retained while a new one is being received and the foregoing one is reproduced.

In this manner, the process may go on without interruption and under constant conditions as long as may be desired. The observer never knows in what order the tones may be given, therefore, his task is constant. The reproduction may take the form of simply naming the tones, or the experimenter may keep the record by checking on a mimeographed sheet which also serves as a guide in sounding tones.

The method just illustrated requires no apparatus other than a piano and a metronome. But ordinarily we find it convenient to use apparatus which operates more automatically and does not tax the experimenter or place so much responsibility upon him. My multiple recorder answers the purpose of a recording instrument under a great variety of conditions. It is a sort of universal recording apparatus in

which the record is made by a series of fountain pens operated electrically and writing on a telegraph tape. The stimuli and the responses are shown in the same tracing.[1]

Let us see what a richness of possibilities we have in this plan. In the first place, we may select any particular sense imagery and any attribute of that image. I have illustrated the case of pitch in auditory memory. In the same manner we might have used a single tone and simply varied its strength, the memory being for intensity of tone. Or we might have selected a series of tones varying only in duration, or in direction. In visual memory, we might use colors, grays of different brightness, form, distance, or movement as seen. In tactual memory, we might use different degrees of pressure, different locations of touch, or different kinds of contact. In kinæsthetic imagery, we might use differences in weight, resistance, or movement of limbs. Many other variations are possible both in these and the lower senses.

In the second place, the difficulty of the task may be varied by varying the number of units, the order of impression and reproduction, the time, the mode of reproduction, and the relative difference in the stimuli, in order to adapt the test to differences in age, ability, practice, memory type, etc.

For normal adults, four units seem to be the most favorable number to use. With young children and with adults of inferior ability, it is ordinarily better to use only three. Three units may be sufficient for any observer unless one plans to allow room for long practice. The number, of course, depends upon the order of impression and the method of reproduction.

For long series and with normal adult observers, the order illustrated in the example I gave of tones is very satisfactory, particularly in that it favors the introspective analysis. This order is the one which I would advocate for most purposes, especially where practice is a factor and introspection is essential.

If a single easy test is wanted, we may simply give eight or ten objects in succession, at a given rate, and then require the observer to reproduce this series immediately. Such a series should, however, not contain more than four units. Thus, from a series of colors, *r*, *g*, *y*, *b*, we may arrange a group like this—*g*, *r*, *b*, *g*, *y*, *r*, *g*, *r*. The observer has to report the order in which the colors are shown.

It is very important to control the time, not only in order to know the duration of the processes but primarily to secure check on tendencies to repeat, rest, and associate. One unit per second is a favor-

[1] *Op. cit.*, p. 8 ff.

able rate both for impression and reproduction. The reproduction is usually bunched and given fast in order to secure rest, or in order to get it in after a moment of hesitation. It should be limited only in the total time for the group, not in the rate.

Much depends upon the mode of reproduction. Names or numbers may be assigned to the stimuli. One may avoid the use of names, *e. g.*, by using a simple form of reaction, or some gesture. Or the reproductions may be made in any other arbitrary terms that may have been agreed upon. Then, again, most of the stimuli that commend themselves for this work may be adapted for repetition or even for detailed reproduction. Thus, in the pitch memory first mentioned, the observer might sit at a second piano and reproduce memory groups by striking the keys in the required order. Singing, humming, or whistling might be substituted for the piano sounding.

Ordinarily, we must assume that the units are so chosen that the discrimination can be made without failure in attentive perception. The observer must familiarize himself with the stimuli before the memory test can properly begin. But the experiment may readily be complicated by introducing memory for detail. For example, suppose that the observer has before him a chart of the fifty Hering grays. Three or four unmistakably distinguishable ones of these are selected afresh as stimuli for each group and the observer is required to indicate the four as accurately as he can on the chart by pointing. The same principle may be applied to other sense stimuli as well.

To sum up, among the merits of this plan are the following:

1. It provides homogeneous and relatively simple memory objects. It gives us memory for color, brightness, pitch of tones, intensity of tones — in short, sensory memory — but, in any experiment, one and only one sensory attribute is varied. Contrast this with the use of poetry, numbers, etc.

2. It enables us to select any desired type of memory object and to adhere to that consistently.

3. It enables us to continue a memory task for any length of time with the same content and with the same degree of difficulty except for fluctuations in subjective efficiency and for traceable adaptation through practice. It furnishes us an intellectual tread-mill.

4. It enables us to vary under control the impression, the retention, the reproduction, and the association.

5. It enables us to get a detailed and permanent record.

6. It gives most favorable conditions for introspection of association and imagery. The uniformity of the process adapts it for fractionating.

7. It promises to be of value in applied psychology. Not only memory itself, but general mental conditions may be investigated through the medium of memory, *e. g.*, fatigue, adaptation, practice, transference of training, comparison of types, comparison of conditions, division of energy, and attention.

METHODS OF DETERMINING IDEATIONAL TYPES.

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Although the existence of the mental image was pointed out definitely by Aristotle in the *De Anima*, the first attempt to accurately describe its nature was made by Fechner[1] in his comparison of the mental image with the after-image. With great introspective skill he analyzed his own visual imagery and found it to be extremely weak and indefinite in comparison with the after-image of his experience. Weaker still was his ability to call up mental images of other sense departments than those of vision. Auditory mental images he found practically non-existent. The voices of friends he could not as readily recall as he could their faces. Simple melodies he found it possible to remember, especially with the aid of his own voice and the movements of his speech-organs. He further reported that it was impossible for him to recall in memory images of taste or of smell.

Fechner did not rely entirely on his own introspections, but by questioning others discovered that his mental imagery was not as vivid as that of some of his acquaintances. He states at some length the replies of six different persons, four of whom were university professors, one of whom was a writer, and the sixth Fechner's wife. These were questioned in regard to the relation between the after-image and the memory image and they were asked to compare the two in respect to color, definiteness, voluntary control, position in space, etc. Fechner reports that his wife possessed vivid imagery of hearing, taste and smell as well as of vision.

Francis Galton[2] some twenty years later took up the problem practically where Fechner had left it. He attempted to discover by means of a set of questions the characteristics of mental imagery of a much larger number of persons than had been the subject of Fechner's pioneer investigation. He began by questioning men in the field of science, whom he found to be singularly lacking in all mental imagery. Extending his inquiries more generally to persons of both sexes and of various ages, he found some possessed of extremely vivid visual

[1] *Elemente der Psychophysik*, 2. Aufl., 469–491.

[2] *Inquiries into the Human Faculty*, 1883.

images, brightly illuminated, clearly outlined, and distinct and rich in coloring. Galton's inquiry, like that of Fechner, concerned chiefly the visual image. It, however, touched upon sound, smell, taste, dermal imagery (touch, pain, temperature) and organic imagery (hunger, fatigue, and other general bodily conditions).[1]

In reviewing the contribution of these pioneer investigators in the field of mental imagery, we should also keep in mind the work of the mental pathologists, chiefly Charcot, who emphasized the existence of distinct ideational types, as revealed in his clinical investigations. Charcot[2] and his pupil Ballet distinguished the visual, acoustic, motor and mixed types. These types were further emphasized by Taine, Ribot, Binet and others. The literature on aphasia is especially significant in this particular.

An impetus to the study of motor and other verbal types in distinction from concrete imagery was given by Stricker[3] and Egger,[4] and taken up later by Dodge.[5] Stricker, who seems to have taken his own type as universal, maintained that no one has definite acoustic or visual imagery of words, but that persons think in motor speech imagery. Egger, on the other hand, likewise generalizing from his own experience, was equally positive that in thinking we normally hear the cadence and rhythm of our own voices, and that this is the true inner-speech. Although Dodge reported that at times he thought in concrete visual imagery, as for example, when he was planning a piece of apparatus, he generally thought in words and pronounced these to himself, but without any auditory picture of these. His inner thinking appeared to be thoroughly speech-motor, and was not accompanied by hand-motor imagery. Dodge reported further that he possessed very weak acoustic imagery — that he could not recall voices, nor sing. This lack of acoustic images appeared to be largely a matter of inheritance, since in this respect he was similar to his relatives. Dodge's work clearly indicates the fact that a person may be speech-motor without being hand-motor and that the classification made by Charcot, which held to a single motor type, was too inclusive. Dodge's introspections also indicated that a person may possess a vivid type of imagery, which, however, may not be employed in ordinary thinking to any extent.

[1] Galton's questionary covers somewhat over two pages, and is given in the appendix to his previously cited work, pages 378–380.

[2] *Leçons sur les maladies du système nerveux.* (1886–1890.)

[3] *Die Bewegungsempfindungen*, Wien, 1871. Also *Studien über das Bewusstsein*, Wien, 1879.

[4] *La parole intérieure*, Paris, 1881.

[5] *Die motorischen Wortvorstellungen*, Halle, 1890.

One of the most important discussions in recent years on the various ideational types is that of Segal,[1] who maintains that the conclusions reached by Charcot and others as to the existence of sharply distinguished ideational types is not altogether correct. Segal observes that not all those who possess intense visual imagery see all the words that they employ in thinking. Indeed such a type of thinking is exceptional and a person may, as Meumann has pointed out, for one purpose think in concrete visual imagery, while for another purpose he may think equally well in acoustic or motor imagery. Individuals apparently think visually concerning concrete objects, and in acoustic-motor terms when they employ words. For these reasons, Segal concludes that the whole doctrine of distinct types is untenable, and that the qualitative conception of ideational types must be abandoned for a quantitative distinction. Most persons belong to a mixed type, and perhaps possess greater vividness of imagery in one direction than others, but are not for this reason confined to one type of thinking. It is not to be concluded that because a person generally thinks in one kind of imagery this is due to the fact that this type of imagery is exceptionally vivid. It is evident that the majority of the perceptions which arouse our attention and are significant for us are visual, and it is, therefore, not remarkable that our thought material should be visual. Segal further urges that a person may be visual for one kind of material and perhaps motor or acoustic for another, and that, therefore, the type must be considered as relative to the material employed. Baldwin[2] remarks that for him "German is speech-motor and auditory, having been learned conversationally in Germany, while the French, which was acquired in school by reading and exercise writing, is visual and hand-motor." In this connection it may be said that in a series of experiments recently conducted in the psychological laboratory at the University of Illinois, it was discovered that the method of learning a series of words by one of the subjects observing, varied according to whether the words were presented in a regular or mixed order, in one instance the learner using visual imagery, in the other acoustic-motor.

Considerations like the above lead clearly to the conclusion that the attempt to determine absolute ideational types is hardly possible and that the best that can be done is to determine the predominating type for a certain class of sensory or verbal material.

The problem of determining ideational types is, however, further

[1] 'Ueber den Reproduktionstypen und das Reproduzieren von Vorstellungen.' *Archiv f. d. gesamte Psychologie*, XII., 1908, 124–345.

[2] 'Internal Speech and Song,' *Philosophical Review*, 1893, II., 385.

complicated by the fact that the methods generally employed are defective in many important respects, and often lead to results so contradictory as to be practically worthless.

Doubtless the most reliable method is introspective analysis. Such attempts as those of Fechner, Galton, Stricker and Dodge, already referred to, as well as that of Wilfred Lay[1] are exceedingly instructive and give most valuable insights. They are, however, studies in individual psychology and care must always be taken not to come to general conclusions, as, for example, Stricker has done, holding that the individual experience is typical. Fechner's questionary method, as developed by Galton and employed by others, has the value of bringing together mass results of introspective analysis, and it thus avoids the error previously spoken of, but it is open to other and more serious objections unless employed with the greatest of caution.[2] When used with subjects not skilled in introspection, I am convinced that even such a carefully prepared questionary as that used by Titchener may give the most misleading results.

Numerous objective methods for determining ideational types have been from time to time devised and employed with fair success. The most important feature of many of these is not the numerical results, but rather the introspective analyses by the subjects of these tests. These introspections, like all subjective analyses, depend, of course, for their value on the ability of the observers to get at their own states of consciousness. For the most part such objective tests as rely largely on the observer's introspection, are, therefore, chiefly of value when employed in testing small groups, and with skilled laboratory subjects. As mass tests their value is much less.

As tests of this type may be cited the 'word method' described by Titchener (*Experimental Psychology*, Volume I., pt. II[3], pages 394–395). This method, as used by Kraepelin, requires the observer to write out a list of objects distinguished by their color, and a second list distinguished by their sound. An equal time is given for each list, and the subject that succeeds better with the first than with the

[1] 'Mental Imagery Experimentally and Subjectively Considered.' PSYCH. REVIEW, Monograph Supplements, II., No. 3 (1898). For his introspective analysis see particularly pages 32–47.

[2] An excellent statement of the value and limitations of this method of getting at introspective facts is given by Titchener, *Experimental Psychology*, Vol. I., pt. II., pages 387–390.

[3] Titchener here conveniently describes a considerable number of tests that he has taken from the literature and in some instances modified to suit the needs of laboratory practice.

second is taken to be a visualizer, while the person who gets better results with the second is held to be of the auditory type. It is quite obvious that the subject may in writing this list have no concrete imagery at all. He may be merely relying on verbal imagery. In this case no conclusions can be drawn from the list of words as to the manner in which he thinks them. For example, the word whistle may be put in the list of auditory objects. Yet the imagery behind it may be entirely visual or motor. On the other hand the word rose may be auditory or motor, although it may be included in the visual list. In verbal imagery there is a slight possibility of judging from the content of the word the type of imagery employed in thinking it.

Secor employs the word method as follows. A number of words are written on slips of paper. The observer glances at these and immediately records the verbal image aroused, and the further imagery that may develop. His type of imagery is then determined by the per cent. of visual, auditory, motor, pressure and other images suggested. A similar list is given with auditory presentation and the two series compared. Obviously the value of such an experiment depends largely, first upon the care of the experimenter in selecting the word series, and secondly on the skill of the observer in being able to detect and record the flight of his imagery. If properly conducted, however, this test has decided merits. Similar to Secor's method is that of Dugas,[1] who determined the memory type by dictating words and getting from the subject a report of the associations aroused.

The methods of Binet and of Cohn of the 'letter squares,' carefully described by Titchener,[2] likewise have their chief value in the introspections of the subject. The letter squares, however, involve an important principle for the objective determination of visual imagery in that they present when given to the subject visually an opportunity to localize a particular letter in a certain place in the square and to reproduce it in its place on a similar blank square. As the correct placing of the letter is dependent to a considerable extent on the ability of the observer to visualize the square, high success in this direction would probably indicate considerable concrete visualizing ability.

Binet's method involves a further principle for determining ideational types. This principle rests on the assumption that the manner of presenting the material favors the visual type when the presentation is visual, the auditory type when the presentation is oral, and the motor

[1] Recherches expérimentales sur les différents types d'images. *Rev. Phil.*, XXXIX., 285–292, 1895.

[2] *Op. cit.*, pages 369–400.

type when the presentation is motor. A very common method of determining whether a given person is visual or auditory has been to test his ability to learn a series of words, for example, by seeing them, and to compare this with his ability to learn them when he hears them read and pronounced. Binet's method involves further the testing of the motor imagery by the experimenter guiding the hand of the blindfolded subject over a series of nonsense diagrams. It is quite obvious that a test like this can give but slight evidence as to the predominating type of imagery possessed by the subject of the experiment, since the three tests are by no means comparable. It is quite clear that the motor is so unlike the visual and auditory both in the material presented, and in the general condition of the presentation, that it would be useless to attempt a comparison of the relative strength of imagery of the subject on such a basis. It may, however, seem possible to make the conditions of visual or oral presentation practically identical in all respects except the one in point of calling up visual or auditory imagery. This identity of conditions, however, is difficult to obtain. Often the material presented visually is also simultaneously presented, while from the nature of the case the material which is given in auditory presentation must be presented successively. If, however, this difficulty is overcome by giving the visual material in successive presentation another difficulty exists when the material is other than single letters and figures. If the material, for example, is words or syllables the question at once arises as to whether the orally presented material should be simply pronounced or spelled in order to make it comparable with the visually presented material.[1] Further, it must be remembered, it by no means follows that because material is presented visually it must be learned with visual imagery, or orally it must be learned with auditory imagery. The translation from one sense department to another is often very rapid and the auditory or motor-minded person may reform material presented visually with practically no loss in mental efficience. At the best, attempts to determine individual ideational types in terms of the method of presentation of the material are valuable only in showing that one subject is superior to another in a certain type of imagery, but not in deciding which type predominates in a given individual.

[1] This simple method of procedure is employed by Hawkins in his experiment on memory types, PSYCHOLOGICAL REVIEW, IV., 1897. In order to determine which was the stronger, visual or auditory memory, he presented to school children two groups of names of ten words. The first group was read at the rate of one word every two seconds. The second group was written on the blackboard and covered. Each word was then uncovered at the rate of one every two seconds.

Meumann[2] discusses at some length two objective methods of determining ideational types, namely, the Method of Distraction (*Methode der Störungen*) and the Method of Helps (*Methode der Hilfen*). The former method consists in giving the observer a definite memory task and measuring the exact time that is required to perform it. Then various distractions are employed, so chosen as to serve as hindrances for various types of ideation, and from the effect of these on the results of the learning, the type of the observer is determined. It is assumed that the auditory type is more easily distracted by auditory stimuli, the visual by visual stimuli and the motor by an interference with 'inner-speech.' The visual type, on the other hand, should not be greatly affected by the interference with inner-speech. The Method of Helps is intended to increase the effectiveness of learning. The visual type is aided by the spatial arrangement of the material presented, but for the auditory type this arrangement may even prove a hindrance to the learning. The auditory-motor type is aided by the subject pronouncing the words seen or drawing them with pencil or finger.

The foregoing assumptions are in part true, but they doubtless contain certain fallacies as methods for determining the ideational type of an individual. In the first place it must be remembered that the method of distraction may lengthen the time of learning or reduce its correctness simply, or largely, by taking away the attention of the subject from the learning and not by inhibiting the mental imagery employed in the learning. This may be illustrated by citing the experiments performed by Binet and later by Meumann on the mathematical prodigy, Inaudi. Binet had Inaudi sing a tone during his calculation. This resulted in lengthening the time Inaudi employed in his operations. Meumann had him hold his tongue between his teeth, to interfere with his 'inner-speech.' This lengthened the time of Inaudi's performance nearly three-fold. It is quite obvious that this result might have been due, in part at least, to distracted attention, and not simply to the inhibition of speech-motor processes. Meumann found that Inaudi was not disturbed by the tick of a metronome. It would not be safe, however, to conclude from this fact alone that Inaudi was predominately motor and not auditory. Such a conclusion could be safely drawn only when the auditory and the motor distrac-

[2] *Über Ökonomie und Technik des Lernens*, Leipzig, 1903. See also the first volume of Meumann's *Vorlesungen zur Einführung in die Experimentelle Pädagogik*, chapter X, for an extended discussion of methods for the determination of ideational types.

tions were quite comparable in all respects except in their quality. To take another example, obviously an extremely bright light would be a greater distraction than a noise of moderate intensity, but it would be very difficult to determine whether the tick of a metronome was more of a distraction, apart from its quality than, for example, the rhythmical appearance of a colored light on a screen. Unless these distractions were properly equated no valid exclusions as to the type of the subject could be made.

The fact that a distraction may merely cause the falling off of the attention given to the task in hand, and not in any way interfere with the use of imagery employed in solving the task, is well illustrated by a series of experiments just concluded by the department of psychology at the University of Illinois. A group of school children were tested in learning nonsense syllables, under normal conditions, and also with various aids and distractions. It was found that one of the greatest distractions, especially for the younger pupils, consisted in requiring them to learn the series with folded hands. This distraction was greater than that of holding the tongue between the teeth in many instances. It might be inferred from the test in which the learning fell off while the subject held his tongue between his teeth, that the result was due to an inhibition of the speech-motor imagery, but it would be difficult to conclude from the fact that the folded hands was accompanied by a falling off in learning that this result was due to an inhibition of the hand-motor imagery, especially since, when the children wrote the words seen, this procedure proved in most cases a hindrance to learning. The falling off in the learning is rather to be attributed to a distraction of attention in the case of the test with the folded hands; it may also be that a similar result when the tongue is held between the teeth is due to a like cause, and not to the inhibition of the speech-motor imagery.

The method of helps is open to an objection similar to the foregoing as a means for determining ideational types. This point is well illustrated by the experiments of W. A. Lay[1] and Itschner.[2] Lay gave school children words to learn under various conditions. They were heard without vocalizing, heard and pronounced in a whisper, heard and pronounced aloud; they were also seen under similar conditions; they were likewise seen and copied. He concludes from this that because vocalization and copying are aids in learning, children are largely speech-motor and hand-motor.

[1] *Führer durch der Rechtschreib-Unterricht.* Wiesbaden, 1899.

[2] 'Lays Rechtschreib-Reform.' *Jahrbuch d. Verein für wis. Päd.*, XXXII., 1900.

Itschner, who repeated Lay's experiments, disagrees with Lay as to the interpretation of the favorable effects of writing the words presented. Itschner does not attribute this effect to the motor ideas in writing, but to better attention and comparison that accompanies the writing. In other words, much of the favorable effect that goes with various aids in learning is not due to a facilitation of the ideational processes employed in the learning, but rather to increased attention and to other general conditions of learning.[1]

Cohn[2] employed the method of helps and hindrance, presenting twelve letters arranged in four rows and learned under the following conditions: 1. Read aloud. 2. Studied with suppressed speech movements. 3. Read during the repetition of a vowel. 4. Read during the counting of numbers from one to twenty. 5. Studied during the reciting of a complicated series of numbers.

The subject was judged as acoustic-motor or as visual by comparing (1) and (2) and also by noting what effect the hindrance in (3), (4), and (5) had.

The letter squares test of Cohn as employed by Titchener[3] is as follows: The observer reads the consonants of the letter square aloud, twice over in the first test. In the second test he studies the letter square at the same time continuously, sounding the vowel *a*. It may be easily seen in the light of the above discussion that the fact that the subject may do better with the first than with the second test would by no means necessarily indicate that he was predominatingly speech-motor rather than visual. It seems quite certain that the complementary methods of helps and of hindrances can, at their best, serve merely to evaluate favorable conditions of learning; they cannot, however, pronounce finally on the ideational type of the learner.

The Method of Style as employed by Fraser[4] and Wilfred Lay[5] attempts to deduce the type of imagery of an author from his writings. Lay counted the consonants in eight pieces of literature, classifying them under the heads of liquids, mutes, silibants, fricatives and semi-vowels. He concludes "that the poet whose rough consonants are greatly in

[1] In this connection see Pohlmann's comment on Lay's experiment. *Beiträge zur Lehre vom Gedächtnis*, page 141, footnote.

[2] 'Experimentelle Untersuchungen über Zusammenwirken des akustisch-motorischen und des visuellen Gedächtnisses,' *Zeitschrift f. Psychologie*, 161–173, XV., 1897.

[3] Titchener, *op. cit.*, pp. 399–400.

[4] 'Visualization as a Chief Source of the Psychology of Hobbes, Locke, Berkeley and Hume.' *American Journal of Psychology*, IV., 230, 1891.

[5] *Op. cit.*

excess of the average has either a less sensitive 'ear' than the ones whose liquids are most numerous, or uses them as an expression of strength. Now an 'ear' in the sense above used means the possession of mental imagery of the auditory kind." I do not believe that this conclusion is at all necessary. The writer, as far as he can discover, has never had in his whole experience a genuine auditory image, and yet he is quite capable of 'feeling' the distinctions brought out by Lay. For him, however, it is entirely a kinæsthetic affair. It is probably, however, a valid conclusion that a person who has such an 'ear' as Lay discusses is possessed of either a good auditory or motor ideational type, or both.

Lay further, in studying several literary masterpieces, noted the various kinds of imagery that were awakened in his mind in reading the lines. This procedure, however, cannot give any conclusive insight into the types of concrete imagery used by the writer, since, as has been previously said in this paper, it is impossible to judge with any great degree of certainty from the content of the word to the imagery in the mind of the person using it. Lay, for example, cites as a case of auditory imagery this from Tennyson:

> "Each of whom had broken on him
> A lance that *splintered like an icicle.*"

For me this is visual and motor. Lay cites, "And *shook* his drowsy squire awake," as an instance of motor imagery. To many, I am sure, this would present merely a visual picture. I do not find that the expression 'made her *cheek burn*' calls up a thermal image, or that the verse, "On either shining shoulder *laid a hand*" is for me tactile.

The assumption that the content of a word as determined by the experimenter gives an index of the imagery in the mind of the observer or author, is at the basis of certain phases of the investigations of Netschajeff[1] and of Lobsien.[2] These investigators tested school children, using, among other material, words such as rough, cold and heavy, to test their dermal imagery; sorrow, joy and doubt, to test their emotions. The writer some years ago tried a similar experiment. By studying the compositions of school children he tried to conclude as to the nature and development of their imagery during the school years.[3] I am still inclined to think that such studies may

[1] 'Experimentelle Untersuchungen über Gedächtnisentwickelung bei Schulkinder,' *Zeitschrift f. Psychol.*, XXIV., 321, 1900.

[2] 'Experimentelle Untersuchung über die Gedächtnisentwickelung bei Kindern,' *Zeitschrift f. Psychol.*, XXVII., 34, 1902.

[3] 'Imaginative Elements in the Written Work of School Children,' *Ped. Sem.*, 1906, XXIII., 84–93.

indicate something, but they are far from being an adequate test for the ideational type of the subject.

Lay, in connection with his study of the style of various authors, observed with care the flight of his own mental imagery, classifying it with great minuteness. This method, however, is purely subjective and depends entirely for its value on the observer's skill in introspection.

One of the most fruitful methods of getting at the ideational processes of an individual is by taking note of characteristic errors made in memorizing various kinds of material. Meumann [1] observes that the visualizer confuses like appearing but different sounding letters, syllables and words, while the auditory minded subject confuses like sounding letters, etc. Féré [2] pointed out this fact when he called attention to a mistake he had made in a report on an autopsy. He wrote *poumon trois* for *poumon droit*. He attributes the mistake to a similarity in the motions necessary to articulate the two sounds, however, rather than to their mere similarity in sound.

Pedersen [3] tested school children with selected words from an English dictionary. These words were of seven letters each and those devised to test visual memory were of such a nature that the spelling and pronunciation did not agree (*e. g.*, borough, fifthly, arights). The acoustic memory was tested with words in which the spelling and pronunciation did agree. Pedersen observes that the acoustic child is likely to confuse like sounding letters such as *c* and *s* and *b* and *p* and to omit silent letters. It seems quite evident that errors of this character may distinguish an auditory or motor minded person from a visual minded, but it cannot throw light in itself on the question as to whether the person is auditory or motor in his ideational processes.

It has further been observed that the visual minded makes less mistakes in learning consonants, the auditory in learning vowels, and that the visual succeeds better when memory for spatial localization is involved than does the acoustic-motor type, while the latter succeeds better when the presentation of the material is accompanied by rhythm and accent.

Among other aids for determining ideational types, which may be constructed into separate tests, or used in connection with various methods, may be mentioned the following:

[1] *Op. cit.*, p. 43.

[2] 'A propos d'une lapsus calami,' *Revue Philosophique*, XXI., 547, 1886.

[3] 'Experimentelle Untersuchungen der visuellen und akutischen Erinnerungsbilder, angestellt an Schulkindern,' *Archiv f. d. gesamte Psychol.*, 1905, IV., 4.

The visual type can easily change the order of material presented, while this is a difficult task for the auditory-motor type. It was found by Binet[1] in comparing Inaudi with another celebrated mathematical prodigy, Diamandi, that the latter, who seems to have been distinctly of the visual type, learned figures in any order whatsoever. Under such conditions Inaudi was at a great disadvantage, and succeeded in solving the problem only by using complicated aids. To take advantage of this essential difference between the visual and the acoustic-motor type Titchener[2] suggests the following test:

"Let O. learn a square of twenty-five figures or letters. If he is visual he can repeat the figures in any order,— by diagonals, spiral fashion, etc.,— almost as easily as he can repeat them line by line; if he is auditory or auditory-motor be will stumble and hesitate when called to travel out of the order of learning."

This test is probably in most instances valid. The writer believes, however, on the basis of his own introspection, that it is possible for a person of an extreme motor type to get certain kinæsthetic cues that serve the motor minded very much as spatial imagery does the individual of a visual type, in locating his material in various orders.

Meumann maintains that the acoustic-motor type is much more rapid in learning than is the visual, but that on the other hand the former is less accurate than the latter and that the acoustic-motor is also a more rapid forgetter than is the visual type. He observes, however, that these differences disappear in subjects of superior intellectual ability and that in such cases the rapid learner is not necessarily the rapid forgetter.

Vividness of imagery in a subject and the occurrence of hallucinatory experiences during waking life and sleep, have been taken by many to indicate the character of the imagery possessed by the person. Fechner, in his account cited above, mentions the existence of hallucinatory experiences as indicating vividness of imagery. Binet[3] states that Féré could "imagine a red cross so vividly as to see afterward, on a sheet of paper, a green cross." June E. Downey[4] has reported a similar fact, experimenting with naïve subjects. Whatever may be the truth of these assertions, I wish to urge that hallucinatory experiences of whatever sort, are not to be taken as criteria for determining the customary ideational processes employed in a person's thinking.

[1] *Psychologie des grand calculateurs.* Paris, 1894.
[2] *Op. cit.*, p. 401.
[3] *The Psychology of Reasoning* (translated by A. G. White), Chicago, 1899.
[4] PSYCHOLOGICAL REVIEW, 1901, VIII., 421.

As I have maintained elsewhere,[1] the mental image is not to be confused with an illusion or hallucination. It has an entirely different function in our mental life than have these false perceptions. The fact that the latter exist may indeed indicate that effective mental imagery is weak just as well as that it is unusually strong. In the case of the writer there seems to be absolutely no connection between vividness of imagery and the predominating type used in thinking. I find not the least difficulty in recalling mentally, rich colors, and I have often experienced just before falling asleep, visual hallucinations of a most pronounced character. I have elaborate visual dreams and have been able to get a complementary image from a memory image. Yet I seldom employ visual imagery in my thinking. In learning a word series I seldom see it as printed or written, my thinking being almost exclusively motor. Further, I have on several occasions experienced auditory hallucinations, but have, as far as I can discover, never had an auditory image. I recently experienced a most vivid taste dream, but I am reasonably certain that I have never used taste imagery in any of my thinking.

The discussion up to this point may be summed up as follows:

1. It is impossible to determine absolute ideational types in most individuals, because such pronounced types exist only in the man of genius, or in the abnormal or exceptional individual. All that can be done is to determine the predominating type of a given individual for a certain kind of material. The predominating type of thinking for an individual may vary markedly with the material and with the manner in which it is presented, so that an individual cannot be said to have a predominating type for all situations.

2. The determination of ideational types is further complicated by the difficulty of obtaining unequivocal methods for such determination.

3. The most trustworthy method is that of introspective analysis in its various forms. With a trained subject it is far more reliable than any objective methods of determining ideational types, and the greatest value of the objective methods in most cases is that they give opportunity for accurate introspections under controlled conditions.

4. Most of the objective methods are open to more or less serious criticism, and not one of them can be relied on alone as final.

5. These methods, in most instances, hardly show more than that one person is superior to another in a certain ideational process; that he is, for example, a better visualizer than another person tested under like conditions. It is much more difficult to determine whether a

[1] 'The Nature of the Mental Image,' PSYCHOLOGICAL REVIEW, 1908, XV., 158.

given person is superior in visual, motor or auditory imagery, because of the extreme difficulty of making the tests for these three types comparable.

6. While it may be possible to distinguish between visual and auditory-motor imagery, it is extremely doubtful if any objective test can be devised to determine conclusively whether a person thinks in auditory as distinguished from speech-motor images. Binet, for example, classed Inaudi as auditory and Meumann concluded that he was speech-motor. In my own individual case, I would respond well to most of the so-called tests for auditory imagery, and yet, in this type of ideation, I am markedly sub-normal.

The whole question of motor imagery is one which is still in a very unsatisfactory state. It is quite clear that there is no general motor type, since a person may be speech-motor without at the same time being hand-motor. Further, there is another type of motor-imagery which, as far as I know, has up to date passed practically unrecognized. It is a type which does not confine itself to the imagery set up by the organs of speech, or by the muscles of the arm, hand and fingers in writing. It is a type which expresses itself in more general motor attitudes and includes all sorts of kinæsthetic images that suggest the individual's relation to a situation and which are the mind-stuff of meaning. It is in such images as these that the writer does a large part of his abstract thinking. This thinking is not imageless by any means, but it does not have the rich ideation of concrete visual or auditory imagery. It is nevertheless substantial and highly important. To detect by purely objective methods such a type of ideation would, I believe, be difficult — indeed, it seems generally to have escaped the introspective analysis of trained observers. In considering motor imagery it should further be kept in mind that much of the so-called visual imagery is not actually such, but is really either the kinæsthetic sensations or imagery due to muscular adjustments of the eyes in accommodation, convergence and orientation of objects in space.

Objective methods of determining memory types are, however, needed, especially in the field of experimental pedagogy, in which a knowledge of the ideational types of children would be most serviceable in the technique and economy of learning. I cannot believe that here the tests advocated by Meumann would be of final validity. He suggests that children be tested for their ideational types as follows: 1. Ask them to write down a list of words characterized by sound, color, etc., five minutes being assigned for the task. 2. Determine whether the visual or oral method of presentation is the better. 3. Ask the children to write down the first idea that comes after a

stimulus word. These methods have already been criticised and found defective for adults. They are even more inadequate for children.

In the face of this uncertainty what may be done? Two criteria may, I believe, be employed for selecting adequate tests for ideational types. The first is that the test determined upon for any particular type should prove itself when employed with an observer known to be clearly of that type; the second is that the various tests should be in agreement with each other. I believe that the next step to take is to discover by careful investigation, in which the introspection of the subject is the chief guide, as many individuals as possible who seem to have marked visual or acoustic-motor types of thinking. An attempt should be made to find subjects of both sexes and of various ages. The next step is to use the various methods now known, or which may be devised, to test out these subjects. Those tests which objectively show the known ideational types of the subjects under investigation may be kept and then further tested out for consistency.

Up to the present time no such consistency is apparent in most of the tests employed. Some years ago Alma Bell and Loretta Muckenhoupt[1] tested the mutual consistency of the various methods given in Titchener's psychology for the determination of ideational types. These tests are, without doubt, the best single collection to be found, and they were considered by the writers of the article to have been shown fairly consistent. A reading of the results of the experiment does not leave the impression that the consistency was as great as should be demanded for standard tests. When it is remembered further that the tests were employed with trained subjects and that the introspections accompanying the tests are by far their most important feature, it will be seen that we are still far from possessing a series of tests that can be in any way relied on for use with unskilled subjects, especially when tested in groups.

There seems to be no valid reason, however, if *a priori* assumptions are left aside and the methods are tested out as has been suggested above, why a considerable number of valid methods of an objective sort may not ultimately be devised which shall conclusively determine whether a given subject under certain conditions employs predominatingly in his thinking visual or auditory-motor imagery; if the former, whether it is concrete or verbal; if the latter, whether it is speech-motor, hand-motor, or motor in the sense of a more comprehensive kinæsthetic ideation.

[1] 'A comparison of methods for the determination of ideational types,' *American Journal of Psychology*, XVII., 121–126, 1906.

ON THE RELATION OF THE INTENSITY OF CHROMATIC STIMULUS (PHYSICAL SATURATION) TO CHROMATIC SENSATION.

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The three dimensions of color are value, hue, and chroma or saturation or hue intensity. Of these the first has long been known to follow, at least approximately, the Weber-Fechner law of the relation between intensity of stimulation and sensation;[1] nothing has been reported concerning this relation for the two other dimensions, and indeed it is difficult to imagine how this problem can be stated for the second dimension, hue. The third dimension, however, chroma, is well suited to investigations of this relation, and it is my object to report in this paper certain simple experiments upon this subject.

The experiments have been made in every case with two circular discs of colored paper, formed from one homogeneous sheet, and cut as shown in Fig. 1. The disc represented by *A* is so cut that when spun each successive concentric ring, from the center out toward the circumference, contains a smaller proportion of the colored paper than its predecessor, the excised portion of each ring proceeding from center to circumference being 0, $\frac{1}{16}$, $\frac{1}{8}$, $\frac{1}{4}$, and $\frac{1}{2}$ of its total area. These ratios constitute a geometrical progression corresponding to the Weber-Fechner law.

Such a disc, when placed upon a white background and spun, produces with most colors a well graduated progression of concentric rings diminishing in chroma (saturation) and increasing in value from the center to the circumference. This experiment shows that in this case of simultaneous variation of two dimensions there is approximate accord with the requirements of the law of Weber and Fechner.

If now the background be changed to a neutral gray of the same value as that of the disc itself, a change which prevents variation in value and leaves but one variable, chroma, the effect of spinning is much altered. The concentric rings now present a very irregular progression of chroma, in that the chroma diminishes at first very little as

[1] Helmholtz, 'Handbuch der physiologischen Optik.' Hamburg, zweite Auflage, 1896, pp. 384–480.

compared with the diminution at the circumference. In this case the variation is not that required by the law.

Disc *B* is so cut that the excised portion of each ring proceeding from center to circumference is o, $\frac{1}{5}$, $\frac{2}{5}$, $\frac{3}{5}$ and $\frac{4}{5}$ of its total area, an arithmetical progression. When the above experiments are repeated with this disc it is found that with the white background the pro-

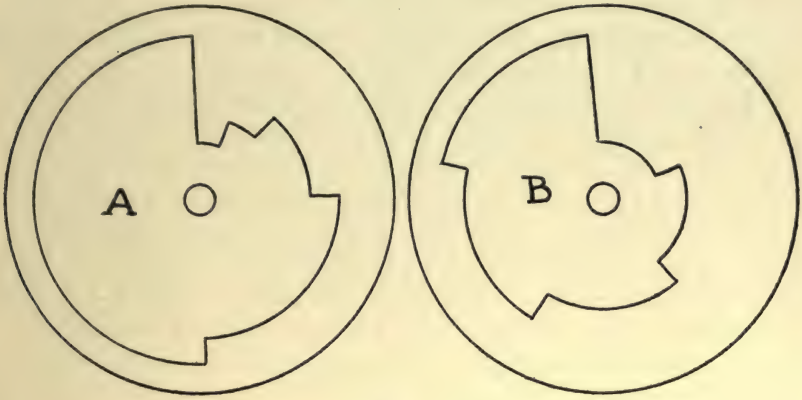

FIG. 1.

gression of chroma sensations is very irregular, the chroma diminishing rapidly at first and then more slowly. With the gray background an even progression of chroma is obtained.[1]

For purposes of demonstration the experiments may conveniently be carried out as follows: disc *A* is placed on the white background, disc *B* on the gray background, and both are spun. The result is an even chromatic progression in both cases. Next disc *A* is placed on the gray background, disc *B* on the white background, and the spinning is repeated. In this case neither progression is even. The experiment is most satisfactory with either red or blue discs of rather low value.

These experiments show clearly that chroma sensation and chroma intensity (physical saturation) vary not according to the law of Weber and Fechner, but nearly or quite proportionately, and in accordance with the system employed in my color notation.[2]

[1] Extensive quantitative experiments with a variety of colors are now being carried out in the hope of extending our knowledge of the laws of variation of the two dimensions here considered.

[2] Munsell, A. H., *A Color Notation*, Boston, 1907.

PSYCHOLOGICAL LITERATURE.

PSYCHOLOGY OF SKILL.

The Psychology of Skill, with Special Reference to Its Acquisition in Typewriting. WILLIAM FREDERICK BOOK. University of Montana Bulletin 53, 1908. Pp. 188.

This admirable study of learning as exemplified in typewriting is of special significance because of its excellent analysis of the various stages of the process. Short cuts, which have come to be one of the most striking features of the early stages of learning, are discussed in detail and in a most entertaining and instructive manner. At the outset, in learning, associations are formed some of which have been previously used in other connections. Learning at this stage is slow and laborious, but soon by a process of elimination and reorganization useless accessories drop out and energy becomes more directly available for the accomplishment of the work in hand. Reorganization of elemental habits goes hand in hand with the perfection of the simpler habits themselves and, as the learner progresses, the identity of the latter is gradually lost in the higher order of habits which develop through this process of reorganization. For the teacher, who is more interested in the way in which these short cuts are made than in a psychological examination of their details, Book emphasizes the importance of careful instruction at the moment when need for it is felt. He agrees with Swift that economic methods are adopted unconsciously. This, of course, makes it important for the teacher to follow the work of each pupil in order to recognize immediately any new adaptation lest uneconomical methods become habitual.

The curves obtained by Book have the same general form as those found by other investigators. Irregularity from day to day and from week to week characterizes the progress. The explanation of these fluctuations in efficiency Book finds in a variety of causes. The physiological condition of the subjects, due to the amount and character of food and sleep, influence of the weather, and fatigue from other causes than the labor of the experiments, play their part, but the principal cause, in Book's opinion, is lapse in enthusiasm and the relaxed attention which follows. The chief reason given for this belief is that the pulse rate is decreased during these periods of arrest, an indication of

lessened effort. The relation between pulse rate and progress is certainly important; but may not the slower pulse be due to the economizing of energy in practicing details which must be automatized before further advance can be made? It is suggestive in this connection that all of Book's curves, including those of the investigator himself, who certainly would put as much effort into the work as seemed productive of results, show plateaus of greater or less length.

Book found the same increase in skill after cessation of practice as others have observed, but he does not accept the usual explanation of subconscious neural activity. The increase in skill found in his memory tests he ascribes "to the disappearance, with the lapse of time, of numerous psycho-physical difficulties, interfering associations, bad habits of attention, incidentally acquired in the course of the learning, interfering habits and tendencies, which as they faded, left the more firmly established typewriting associations free to act." The difficulty in accepting this explanation lies in the fact that when once the skill has been acquired all of these difficulties have been eliminated, as is shown by the even skill of the expert, and yet when the memory test is made some of the old obstacles to progress reappear but are quickly overcome, while the greater score indicates increased skill.

Book rightly attaches great importance to the hygiene of learning. "It is not what the learner would like to do that determines his rate of progress in learning, but what his mental and physical conditions at the time will let him do." When the subjects were not in good form for the work more mistakes were made, less was accomplished, a feeling of dislike for the work developed, and, more important, perhaps, than all else, the learners dropped down into the earlier and less skillful habits of work. The newer methods of forging ahead and achieving results, which had led to short circuiting, were no longer operative, and so the time was apparently not only lost but, in addition, bad habits were acquired which had to be sloughed off by patient work on the better days. If this is true of adult learners who have a scientific interest in the work in which they are engaged, with the enthusiasm that it engenders, it certainly has much more force with children, and raises again the question of whether the present rigid curriculum of the day is educationally economical. Would it not be better to have a more flexible program which could be easier adapted to the daily needs of individual children?

Altogether these experiments are most suggestive and cannot fail to stimulate investigation along several lines.

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DEVELOPMENT AND LEARNING.

Studies in Development and Learning. E. A. KIRKPATRICK. Archives of Psychology, edited by R. S. Woodworth, No. 12. New York, Science Press, 1909. Pp. 101.

Under this title the head of the department of psychology and child study in the Fitchburg Normal School publishes theses prepared by members of the advanced class of 1907. These theses were based upon data secured by a series of measurements and tests extending over a period of five years. The studies are well worked out and some of the methods employed are ingenious.

Tests and measurements showed that while boys are at six heavier and taller than girls, the girls exceed the boys at thirteen, passing them in weight at eleven and in height at ten; but boys have greater chest and head measurements throughout. In a comparative test, it was found that auditory memory is slightly better than visual up to the age of eight or nine and that the reverse is the case later. The memory of girls is a little better than that of boys. In testing quickness of perception and movement, it was found that children were considerably more efficient with each year up to nine, with less increase of power up to eleven or twelve and hardly any later. Girls were found from eight to ten per cent. quicker than boys. Children at any age were not only better than they were a year before, but also better than preceding classes had been at the same age but with one year less of practice.

The development of the artistic sense was traced through decorations of portfolios made by children in October and June of five successive years. The bright colors used by young children gradually changed to neutral tints, though older girls still used colors more than did the boys. They began with designs based on geometric forms and later used more nature forms and objects associated with their play, work, seasons, etc., and considerable lettering in the upper grades. In penmanship, few more than half of the pupils showed improvement from October to June or from either date in one year to the same in the next, and a few pupils lost ground in each case. From June to October, more than half remain stationary, while about equal numbers gain and lose respectively. Between nine and twelve is a period of little or no progress. Then girls improve again, but boys generally do not until still later, if ever.

A study of the judgments of children by teachers made by comparing reports of different teachers led to the conclusion that teachers

generally judge children in the same way and correctly, unless there is some irregularity in the physical and mental growth of the children.

Investigations of the curve of learning gave the usual conclusion that the decrease in time required to do a certain task diminishes rapidly with practice at first: then more slowly and finally not at all.

In testing visual memory, through reproduction of figures shown to pupils, it was found that motor, associative, visual and verbal methods of memory were all used,— usually more than one combined. Children remember wholes and use the motor methods much, while adults study details more and depend more on association. Hence adults are much more superior to children in correctness as to details than in general form and proportion. The results were found much better when a motor method of memorizing (drawing on desk with finger) was prescribed than when visualization was depended upon or the child allowed to choose his own method. This suggests the wisdom of practice in drawing maps, manual training and laboratory methods.

One investigator concluded, perhaps somewhat unjustly, from answers given by pupils in upper grades and high school that 82 per cent. use some form of merely verbal memory. Rather more than half of the pupils spoke of certain tests by which they determined when they knew their lessons, and these pupils had the highest marks. Reciting by sections or answering questions expected from the teacher were the commonest tests. It is interesting to note that the lower the marks received the longer time was spent in the preparation of the lesson. The lowest marks were received by boys who spent 150 minutes of time on lessons in the school-room, while the highest were received by pupils who spent 60 minutes in uninterrupted home study on the same lessons.

In learning music, it was determined that the best method of all is reading the score and playing at the same time,— the ordinary practice; while the poorest was listening to some one else play. In learning, children thought more by letter, syllable or number symbols, and adults relied more on the visual method, imaging either the keyboard or the score.

An attempt was made to discover children's ideas of right and wrong, by asking those of different grades to tell the worst thing a boy or girl can do and why it is culpable. Standards vary with age and sex. Disobedience appears the worst of sins to the young child, acts likely to ruin reputation to adolescent girls, dishonest practices to adolescent boys, etc. Girls care most for what people will think

of them, boys for faithfulness to whatever law they recognize as a standard. The teacher may learn much from such a study of how to choose the strongest influences for boys and girls of all ages.

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THE FRANKFORT MEETING OF EXPERIMENTAL PSYCHOLOGISTS.[1]

The third *Kongress für Experimentelle Psychologie* was held at Frankfort in April, 1908. The society is in a vigorous condition, and has an active membership of one hundred and twenty-eight. Professor G. E. Müller presided over the meetings, while Professor F. Schumann acted as secretary, and published the report of the proceedings. As in the preceding year, the program contained a number of *Referate* of a general nature besides the customary briefer papers upon more specific topics. The American psychologist is struck by the wide range of subjects covered by the German society; but more striking still is the efficient and thoroughgoing fashion in which the German society handles its problems. In the papers and discussions a high standard of excellence was maintained throughout; and the report of the proceedings is a valuable contribution to the literature of psychology.

The general reviews upon assigned topics were contributed by Professors Edinger, Claparède, Pick, Bühler and Specht.

L. EDINGER. *Die Beziehungen der vergleichenden Anatomie zur vergleichenden Psychologie.* Pp. 1–22. It has long been felt in many quarters that the anatomist has little of real value to offer to the psychologist. As a matter of fact, the two sciences have much in common, and their progress has brought them into closer relationship with each other. Indeed, the anatomist's knowledge of the brain possessed by any animal enables him to predict a majority of the mental functions of which the animal is capable.

It is convenient to regard the brain of the higher vertebrates as being composed of two parts: the *palæencephalon*, which is found throughout the animal series, and the *neencephalon*, which does not appear below the fishes, and which reaches its maximum development in man. (The neencephalon is apparently identical with the cerebrum, while the palæencephalon may be said to coincide roughly with the sub-cerebral centers.)

[1] *Bericht der III. Kongress für Experimentelle Psychologie.* F. Schumann, Leipzig, Barth, 1909. Pp. xxii + 263. 9 M.

The form and structure of the palæencephalon is such as to make it appropriate for the receiving of impressions from without, and for the transmission of impulses onward to the muscles. No part of this organ can be excised without producing disturbances in the behavior of the animal; and its parts are found to be developed in proportion to the demands made upon it by the life of the animal. For example, the cerebellum disappears in certain sedentary forms while in strong swimmers and fliers it attains to a considerable bulk.

The fishes are capable only of palæencephalic behavior. They possess a variety of reflex and instinctive functions; and at this level of the scale animals are able to modify their reactions in a very limited fashion. Thus, while the fishes may be trained to avoid dangerous situations and to approach food, certain allied forms, which are so shy as to flee from shadows, remain unmoved in the presence of much more intensive stimuli, which have no biological significance for them. It is characteristic of palæencephalic behavior that so long as the stimulus acts in unchanged form the reaction ensues in stereotyped fashion. If a moving object constitutes the food-stimulus, all moving objects arouse the seizing reaction. Moreover, if the first attempt to seize the prey should prove unsuccessful the reaction ceases then and there, and the animal remains quiescent until it is restimulated.

The advent of the neencephalon in the animal series is attended by a complete change in behavior. The animal is no longer dependent upon the chance stimulation of the moment; prey is now sought and pursued. Not only is it possible, at this stage, to form associations and to recognize, but there is evidence of a capacity to anticipate what is about to come. It is a significant fact that the rise and development of the neencephalon is paralleled by a rise and development of associative functioning; and that the maximum development of the palæencephalon — in birds — is attended by a maximum development of instinctive behavior.

In the fishes, then, we have representatives of purely palæencephalic animals; in reptiles and in birds a rudimentary neencephalon coöperates with the palæencephalon; while in mammals the neencephalon has reached such a development as to lead one to expect that the reflexes and the instincts are here subordinated to the intelligence. And this expectation is fulfilled in all mammals where the neencephalon has come to outweigh the remainder of the total brain-mass.

E. Claparède. *Die Methoden der tierpsychologischen Beobachtungen und Versuche.* Pp. 22–59. A systematic summary and criticism of the methods employed in comparative psychology, with numerous illustrations from the literature.

A. Pick. *Ueber das Sprachverständnis vom Standpunkte der Pathologie aus.* Pp. 59–93. A historical sketch, with full bibliography, of the investigations in this field. The understanding of speech is a synthetic function which includes a variety of component processes. Sherrington advocates the view that the auditory organ represents only a very highly developed organ in the series of distance-receptors which are connected with one another by a complex brain structure for the purpose of adaptation to environment. And from this point of view the function of the understanding of speech may be regarded as a condensation which is carried on from the cochlea to the cortex. And if determinations of this process may be regarded as showing that it consists of numerous stations, one cannot be surprised when one remembers that so simple a function as cutaneous sensitivity demands the presence of no less than five stations (v. Monakow). It was my problem to discover the elements whose synthesis constitutes this cochlea-to-cortex process. The examination of pathological cases enables one to determine what centers correspond to particular absent or present elements, and to discover the reciprocal relations obtaining between the individual processes. The chief contribution which pathology has been able to make in this domain has to do with the understanding of verbal sounds; and it seems possible that pathology can still further aid psychology by indicating the more promising points of attack upon the problem.

K. Buehler. *Ueber das Sprachverständnis vom Standpunkte der Normalpsychologie aus.* Pp. 94–130. The auditory image of a word is a complex structure in which the following elements are blended into a unitary whole: the melody of the word, the distribution of ictus, certain definite temporal relations, and a qualitative mixture of tonal and noise elements. But even when the structure or composition is understood there still remains the problem of its rise or origin in consciousness. A synthetic procedure promises the best results. But serious difficulties are encountered: lack of experimental material, lack of experimental method (no instantaneous method of presentation similar to tachistoscopic exposure). Moreover, different verbal constituents (vowels and consonants) are apprehended with different degrees of facility; and the context has an influence upon the apprehension of individual words. If we ask what we do when we understand the meaning of words, phrases and sentences, we find we have a complex problem which is related with the general problem of the psychology of meaning. We do know, at least, that we usually mean more than we ideate. And it frequently happens that the sen-

sory content stands at the center of the meaning consciousness; but it also happens that the idea may lie so far from the center as to seem to be no more than a mere concomitant phenomenon. After all, we know but little of the thought consciousness. There is probably a conscious relation between the content which constitutes the meaning consciousness, and the auditory image of the word; indeed, certain investigators regard this relation as the essential characteristic of the meaning consciousness. The sentence has a meaning of its own which is more than an aggregate of the meanings of the individual words. And, indeed, the meanings of the words themselves are modified by the meaning of the sentence as a whole.

W. SPECHT. *Das pathologische Verhalten der Aufmerksamkeit.* Pp. 131–191. A summary, criticism and evaluation of investigations which have dealt with the pathological relations of the attention. Ribot regards attention as a form of monoideism, or concentration of consciousness in a single direction. Attention is regarded as a simple mechanical device. Peripheral stimulations give rise to sensori-motor excitations, and these in turn produce an intensification of the mental content — and that is attention. All of the pathological conditions of attention — its atrophy, hypertrophy, and congenital weakness — are traceable to disturbances in sensori-motor excitability. It may, however, be urged against Ribot's conception that mental phenomena are not explained by translating them into physiological terms. De Sanctis has done valuable service in determining certain phenomena of attention, but he has contributed nothing to the psychological analysis of its pathological conditions. Ziehen has brought forward a conception which abounds in contradictions, which are discussed in detail by Specht. Kraepelin's presentation is the most satisfactory to be found in the literature. Any attempt to evaluate current theories of attention in the light of pathological data reveals the fact that all of the theories are unsatisfactory. The author refers to the work of Aschaffenburg, Lipmann and Isserlin, and closes with the statement that the determining tendency or *Einstellung* of attention is to be regarded as a directing of the immediately experienced I toward a definite goal which need not itself be intuitively given. In this regard attention manifests itself as will.

I. APPARATUS.

Marbe demonstrated his ingenious method of recording tones (pitch, intensity, clang-tint, and duration) by means of a deposit of smoke from a Koenig flame apparatus.

Alrutz illustrated the abnormalities of color vision by means of a series of autochrome plates, and demonstrated the Thunberg and the Alrutz algesimeters.

Rupp (Spindler & Hoyer) demonstrated a color mixture with variable sectors, a distance variator, a spectral apparatus, a tonometer and a vowel apparatus. He displayed a collection of nonsense syllables (Müller and Schumann) which his firm has put upon the market.

II. Anatomy and Physiology.

C. U. A. Kappers. *Ueber die Bildung von Faserverbindungen auf Grund von simultanen und suksessiven Reizen.* Pp. 195–199. Comparative neurology shows that the receptor regions play an important part in cerebral development. The law of association by contiguity in time is a fundamental law of brain structure.

F. O. Schultze. *Die Bedeutung psychologischer Fehlerquellen bei Blutdruckmessungen nach Riva-Rocci und v. Recklinghausen.* Pp. 211–212. Most errors are due to an insufficient number of readings, and to the fact that the variable height of the mercury is not obscured from the observer. When this factor of suggestion is excluded readings become more uniform.

III. General.

J. Plassmann. *Beziehungen zwischen der Astronomie und Psychologie.* Pp. 199–202. A discussion of time estimations and photometric determinations, and a reiteration of the fact that astronomy confirmed Weber's Law before psychology formulated it. The data which have accumulated in astronomical observations are of value to the psychologist, especially for the reason that these observations were not made *ad hoc*.

IV. Sensation.

A. Guttmann. *Farbensinn und Malerei.* Pp. 234–6. To what extent does individual variation in color vision play a part in the production, and in the estimation and enjoyment of paintings? The author's investigations show that anomalous color vision is of negligible significance in both these regards. Artistic genius is a matter not of sensation but of the higher mental functions; and cases are found where the possessor of an anomalous color system has become a distinguished colorist (three such cases are reported by Guttmann). While the anomalous individual may fail to appreciate certain fine gradations of coloring, yet these individuals are so rare as to be negligible by the æsthetician and the artist.

C. MINNEMANN. *Beobachtungen an kurzdauernden Lichtreizen.* Pp. 252–6. A discussion of data obtained by different methods of heterochromatic photometry. The flicker method is of doubtful value unless extreme care is taken to control the temporal conditions of stimulation.

G. RÉVÉSZ. *Ueber Orthosymphonie* (*eine merkwürdige parakustische Erscheinung*). Pp. 243–4. A remarkable case of abnormal hearing. Clangs between e^3 and d^4-sharp were heard as g^2-sharp or g^3-sharp; in another case e^3–b^2 were heard as f^2-sharp, c^3–f^3 as c^3, f^3-sharp–b^3 as f^3-sharp, and c^4-e^4 as c^4. A mistuning of individual clangs in chords was not detected by the observer.

V. PERCEPTION.

A. AALL. *Ueber den Massstab beim Tiefensehen.* Pp. 203–6. Advocates of the empiristic or genetic view of space perception hold that objects seen in double images cannot be localized definitely; while the nativist contends that such localizations can be made through the medium of retinal 'feelings of space.' Aall attacks the problem by means of an apparatus (the bathoscope) which enables him to present three vertical rods at variable distances from the observer. The procedure consists in fixating the rod which stands at an intermediate distance, and varying the position of the nearer and farther rods in such a manner as shall give a definite expression to the observer's estimate of the relative distance of the three rods from each other. The results are, unfortunately, reported in such condensed form as to be unintelligible to the reviewer; but they are held by the author to confirm the nativistic assumption of a retinal clue to distance.

W. STERN. *Die Entwickelung der Raumwahrnehmung beim Kinde.* Pp. 239–242. The acquisition of spatial relations is a gradual development which originates from the '*Urraum*' of the mouth region. At this region are made the earliest differentiations of space, and here originates, within the first few weeks, a definite sensori-motor reaction — a touch upon the cheek being responded to by a turning toward the stimulus-object. In the development of spatial perception '*Nahraum*' is the first to emerge from the chaos. This may be represented by an approximately hemispherical volume whose center is the mouth and whose radius is about 30 cm. Within this region objects are localized, within the first few weeks, by means of the mouth and of vision: but the hand soon becomes a localizing agent also. The coördination of hand and eye is a product of experience; but it is

acquired in the first three months. Infants do not reach for objects which lie beyond the '*Nahraum.*' The ear becomes an instrument of '*Fernraum*' localization during the second three months; but the spatial perception of distant objects is imperfect until locomotion is established.

Pictures which but partially resemble objects are correctly recognized at the beginning of the second year. Contour is the chief factor in this primitive recognition, but the internal details furnish a secondary criterion. Color, size and even spatial position are relatively insignificant factors at this stage. An appreciation of perspective is present from the end of the second year.

Children are indifferent to spatial position long after spatial form has been acquired. The picture-book is enjoyed equally well in inverted position. Even at the age of five years letters and figures are written in haphazard position,— some being turned through ninety degrees, others through one hundred and eighty, while some are written in mirrored form.

VI. Association and Memory.

O. Lipmann. *Zur Beurteilung der Reaktionen bei Gedächtnis- und Aussageversuchen.* Pp. 212–218. In investigations of memory it has been customary to regard all errors as being of equal magnitude, and to enumerate them as so many units. Witasek however has proposed a method of computation which assigns different values to different sorts of errors. The author presents a detailed criticism of Witasek's plan, pointing out that such a scheme is false in principle, that it yields nothing more than is yielded by a simple enumeration of errors, and that experimental data obtained by the investigators of memory are enlightening in their gross form even if they do not admit of being evaluated in terms of a system of value coefficients.

A. Michotte. *Gedächtnisversuche mit mehrfachen Assoziationsrichtungen.* Pp. 259–263. An investigation of the recall of logical relations, and of the relative efficiency of memory for different sorts of material. Selected pairs of words were presented visually, and the observers were asked to apprehend their logical relations. The results reveal the fact that recall may be either direct or mediated. In the latter case the intermediate process was usually a mental image, but it frequently happened that the sole intermediate bond was a consciousness of relation. The consciousness of relation may be of two sorts: a genuine mediating process, or a mere concomitant phenome-

non; but in either case its presence furnishes an aid to memory. The observers varied but little in memorial efficiency so long as logical relations were employed as material; but when numbers were substituted for the words a wide individual variation appeared.

F. E. O. SCHULTZE. *Bericht über Assoziationsversuche des psychologischen Instituts der Frankfurter Akademie.* P. 257. The investigation of Thumb and Marbe was continued in a series of mass experiments, whose results throw light upon the influence of age upon association. The laws formulated by Thumb and Marbe were confirmed; and it was even found that children show a preference for associations between similar word groups. This is particularly true of adverbs of time and place, and of numbers.

Recent writers have reported that reaction experiments may be employed to surprise a suspected criminal into a betrayal of his guilt. Schultze submitted this method of criminological diagnosis to a test. He reports that the method has but a limited value.

W. PETERS. *Ueber Erinnerungsassoziationen.* Pp. 245–7. A word was presented orally, and the observer was asked to report a personal experience of a definite sort. He also recorded the affective tone of the memory and of the original experience. The results indicate that all four observers have a marked tendency to recall pleasant experiences. In the memories, however, the indifferent hedonic tone predominated, but here again the pleasant outnumbers the unpleasant. There is a large individual variation throughout. Memories of very recent events (up to two days) contain more unpleasant details and less unpleasant features than memories of very distant events (ten years).

N. ACH. *Ueber eine Methode zur Untersuchung der simultanen Assoziationen.* Pp. 218–226. Investigators of memory have dealt almost exclusively with successive associations. But conscious processes also manifest a marked tendency to associate simultaneously. The investigation of this sort of association is beset by peculiar difficulties in that the *Perseverationstendenz* and the successive associations introduce disturbing factors. Ach overcomes the difficulty by an ingenious variation of method. Complete and systematic changes in the temporal conjunction of his presented material (permutations of groups), an exceedingly brief exposure time (150–200 σ), a careful choice of material, and precautionary instructions to his observers seem to fulfil the necessary conditions of procedure. His method demanded a special form of exposure apparatus — and Ach devised an apparatus which embodies the combined principles of the tachistoscope

and of the revolving disc. The Hipp chronoscope was introduced as a supplementary apparatus.

Ach presents only a preliminary statement of his results, — from which it may be gathered that certain laws of successive association (retroactive and associative inhibition) are valid also for simultaneous associations.

VII. The Thought Processes.

A. Grünbaum. *Ueber Abstraktion des Gleichen.* Similar figures were selected from a heterogeneous group. Introspection shows that the experience of abstracting contains two widely different processes. These may be described as simple disjunction, and consciousness of relation; and the former is independent of the latter because in some cases the disjunction of the figures was accomplished without any consciousness of relation being present. A second series of experiments resulted in establishing a distinction between apperception and abstraction. Yet the essential features of the abstraction may best be described in terms of internal attention (Külpe). Yet another group of experiments furnished an analysis of the experience of similarity (*Gleicheit*) into two parts, — a consciousness of relation, in the narrow sense, and a group of concomitant processes such as mental start or shock, relief, satisfaction and the like. The consciousness of relation depends upon the sort of datum which constitutes the basis of the relation; and various sorts of relational bases may be distinguished.

E. Dürr. *Ueber die experimentelle Untersuchung der Denkvorgänge.* Pp. 232–4. The methods and results of recent investigations of the thought processes are summarized and criticised. The criticism is chiefly directed against Bühler's 'Tatsachen und Probleme.' Dürr points out that investigators have not been careful to distinguish between 'thinking' and 'reflecting upon,' nor indeed have they correctly understood the meaning of the former which has constituted the subject-matter of their investigations. Bühler attempted to determine the nature of thought by approaching it from single abstract points of view; his analysis into *Regelbewusstsein*, consciousness of relation and intention, does not solve his problem, because thought is much more than a mere aggregate of independent components.

Dürr holds that the only way to determine the nature of thought is to compare it with other contents of consciousness. Do thoughts contain non-sensational components? What is the relation of thought to these components? The author agrees with those who hold that something besides sensational factors is present in the consciousness of

space, time, similarity, movement, change and the like; and he believes that the discovery of the non-sensational component will reveal the nature of thought.

VIII. The Psychology of Language.

A. Thumb. *Assoziationsversuche im Dienste der Sprachwissenschaft.* Pp. 247–8. The history of language shows instances of verbal forms which have been corrupted by other word-forms which are in some way related to them. The corruption could have arisen only through the medium of a mental association between the corrupting and the corrupted forms; and the question arises: What characteristics must a verbal association possess in order to be able to exert a contaminating influence?

The experiments of Thumb and Marbe show that associations such as would fulfil the philological conditions (give — take; difficult — easy) are just the associations which are preferred by most observers, that these ready associations have the briefest association-times, and that the association-time decreases with increased frequency of association. Later experiments confirm these findings, and demonstrate that the associations in question are characterized by immediacy. It is remarkable that these ready associations are a product of individual acquisition; the prevailing associations of children are not of such a character as would account for verbal corruption.

Bruno Eggert. *Sprachmelodische Untersuchungen.* Pp. 208–211. Selections from two authors were spoken into a Marbe recording apparatus. The results show that individuals differ in the pitch and the vocal range of their spoken discourse, as well as in their preference for certain pitches. The 'curve of melody' reveals an alternation of pitches in ascending and descending phases, both of which differ in magnitude and in direction. The descending phase is of greater magnitude and of longer duration than the ascending.

Paul Menzerath. *Psychologische Untersuchungen über die sprachliche Kontamination.* Pp. 249–252. A historical sketch of the problem, and a description of the author's procedure. No statement of results.

IX. Abnormal Psychology.

S. Alrutz. *Halbspontane Erscheinungen in der Hypnose.* Pp. 244–5. When it was suggested to a hysterical patient that a definite part of his body became immobile it was found that the cutaneous sensitivity of that region was decreased, and similar changes occurred in the olfactory and visual senses. It was suggested to another

hysterical patient that he could feel pin-pricks in an insensitive region. Not only was this suggestion successful, but it was attended by a heightened sensitivity to pressure, temperature, olfactory and gustatory stimuli.

X. Æsthetics.

Fr. Schmidt. *Untersuchungen über die spontane ästhetische Empfänglichkeit des Schulkindes.* Pp. 258–9. Pictures were shown to school-children of various ages and degrees of intelligence; and an attempt was made to obtain a natural and unconstrained record of their spontaneous reaction to the æsthetic situation. Notwithstanding the serious difficulties of the method the author believes that the results indicate the existence of five stages of æsthetic development. The characteristic attitude at the lowest stage is largely sensual, but the later stages show the dawn of fanciful supplementation, *Einfühlung*, and æsthetic evaluation.

J. W. B.

WEBER'S LAW.

Das psychophysische Gesetz und der Minimalsehraum. R. v. Sterneck. Zeitschrift f. Psychologie, 1908, XLVII., 96–116.

Owing to our lack of knowledge about the processes arising in a nerve under the influence of external stimulation we do not know what is the stimulus in the proper sense of the word. From this comes that physical processes may be measured in very diverse units of measurement, so that a direct verification of Weber's Law is entirely out of question. In some simple cases, however, as, *e. g.*, in experiments with lifted weights, there is no doubt as to the unit in which the external stimulus must be measured, and it is exactly in those cases that Weber's Law is valid. The author suggests regarding this law as a postulate, *i. e.*, to require that the external stimulus be determined in such a way that this law holds. This is similar to the procedure of physics, where the law of conservation of energy is deduced from comparatively crude experience and where this proposition is introduced later on as a principle with which all phenomena must comply. The method of transforming the unit of measurement in such a way that the experimental results conform with Weber's Law is illustrated by the results of König and Brodhun on just perceptible differences of intensities of light.

The measurement of sensations is restricted to those cases where the sensation produces ideas of spatial or temporal quality, so that the

ideas resemble their objects in regard to these qualities. Let such a quality of an idea, which corresponds to the stimulus r measured in any unit whatsoever, be called r'; we transform the unit of measurement of r in such a way as to conform with Weber's Law, obtaining $f(r)$ for r and $f(r')$ for r'. The question is whether the sensations conform with Weber's Law. Hillebrandt's experiments on space perception show that there exists a relation between actual and estimated space distances, *i. e.*, between sensation (estimated distance) and stimulus (actual distance). Two distances are just perceptibly different, if the difference between their binocular parallaxes is equal to the minimum of disparation. It is found that if these quantities are determined in a system of measurement which conforms with Weber's Law, the sensations conform with it too. The author believes that his results show the correctness of Meinong's interpretation of Weber's Law.

F. M. URBAN.

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BOOKS RECEIVED FROM MAY 5 TO JULY 5.

Psychologie de l'Enfant et Pédagogie expérimentale. ED. CLAPARÈDE. (2d ed.) Geneva, Kündig, 1909. Pp. viii + 283.

"Enkhiridion" o Manu-Libro di Epikteto. Trans. by C. S. PEARSON and L. COUTURAT. Paris, Delagrave; London, Pitman; Stuttgart, Franckh; 1909. Pp. 24.

Program of the Association for International Conciliation, and sixteen other pamphlets, by various authors. New York, American Branch of the Association, 1907–9.

Poems of Personality. Second series. REGINALD C. ROBBINS. Cambridge, Riverside Press, 1909. Pp. 229.

Indian Implements from Graves at Athens, Pa. CHRISTOPHER WREN. (Reprinted from Proceedings of the Wyoming Historical and Geological Society.) Wilkes-Barre, Pa., 1908. Pp. 18.

Le Doute. DR. PAUL SOLLIER. Paris, Alcan, 1909. Pp. 404. 7 fr. 50.

Genetic Psychology. EDWIN A. KIRKPATRICK. New York, Macmillan, 1909. Pp. 313. $1.25 *net.*

Einleitung in die Philosophie. WILHELM JERUSALEM. Vienna and Leipzig, Braumüller, 1909. Pp. 277.

The Eternal Values. HUGO MÜNSTERBURG. Boston and New York, Houghton, Mifflin, 1909. Pp. 430. $2.50 *net.*

The Dialectic of Plotinus. HARRY ALLEN OVERSTREET. Berkeley, University Press, 1909. Pp. 29.

Two Extensions of the Use of Graphs in Elementary Logic. WILLIAM ERNEST HOCKING. Berkeley, University Press, 1909. Pp. 31–44.

La Criminalité dans l'Adolescence. G. L. DUPRAT. Paris, Alcan, 1909. Pp. 260. 6 fr.

The Social Will. EDWIN ANDREW HAYDEN. Psychological Review Monograph, No. 41. Lancaster, Pa., Review Publishing Co., 1909. Pp. 934. $1.00.

La Naissance de l'Intelligence. DR. GEORGES BOHN. Paris, E. Flammarion. Pp. 350. 3 fr. 50.

Commission of Education Report, 1908. Vol. 2. Pp. 383-1090.

NOTES AND NEWS.

PROFESSOR BALDWIN has resigned his position in the Johns Hopkins University. He is advised to give his voice a prolonged rest from continuous lecturing. He will spend a year at least abroad (Present address: Banque Fédérale, Geneva).

DURING the coming year Professor Buchner will conduct the philosophical seminary at the Johns Hopkins University, with the assistance of Dr. Furry. Special lecture courses will also be given by Professor Dewey, of Columbia University, and Professor Tufts, of the University of Chicago.

THE present number of the BULLETIN, dealing especially with experimental psychology, has been prepared under the editorial care of Professor J. W. Baird.

WE have received the final announcement of the Geneva Congress of Experimental Psychology, containing the full program. The dates of meeting, general topics, and arrangements are as noted in our March number.

THE following are taken from the press:

DR. PERCY HUGHES has been promoted to the rank of full professor of philosophy and education at Lehigh University.

DR. S. P. HAYES has been made professor of psychology at Mount Holyoke College.

AT the recent commencement of Columbia University the degree of doctor of letters was conferred on Professor Mary Whiton Calkins, of Wellesley College.

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THE

PSYCHOLOGICAL BULLETIN

THE METHOD OF PAWLOW IN ANIMAL PSYCHOLOGY.

BY ROBERT M. YERKES AND SERGIUS MORGULIS,
Harvard University.

About eight years ago Professor J. P. Pawlow, Director of the physiological department of the Institute of Experimental Medicine in St. Petersburg, devised and introduced into his great research laboratory an ingenious and valuable new method of investigating the physiology of the nervous system in its relations to the so-called psychic reactions of organisms. This method — now widely known as the Pawlow salivary reflex method — has been extensively employed by Pawlow and his students in St. Petersburg. Recently it has been introduced into the Physiological Institute of Berlin by Nicolai, a former student of Pawlow. It consists in the quantitative study of those modifications of the salivary reflex which are conditioned by complex receptive and elaborative processes (psychic reactions) in the central nervous system.

Inasmuch as practically all of the results of the method have been published in Russia, it has seemed to us important that a general description of the technique of the method, together with a statement of certain of the important results which it has yielded, should be published at this time in English. Our purposes in preparing this article were two: first, to present a body of facts which is of great importance to both physiologists and animal psychologists; and second, to familiarize American investigators with the salivary reflex method and hasten the time when it shall be as advantageously used in this country as it now is in Russia.

The materials for this discussion we have obtained chiefly from six papers.[1] Of these the first four are, in the main, general accounts

[1] 1. Pawlow, J. P., 'Sur la sécrétion psychique des glandes salivaires (Phé-

of the method and its results from the strikingly different points of view and interests of Pawlow and Nicolai. The papers of Selionyi and Orbeli are admirable reports of facts. At the end of this article we present a complete bibliography of the subject to 1909. We are indebted to Professor Pawlow for a number of the titles included in this list and also for a thorough revision and correction of the bibliography.

Our discussion naturally falls into four parts: (1) A general description of the method of its application, from the standpoints of Pawlow, Nicolai, and Selionyi; (2) an expository summary of the study of the auditory reactions of the dog as reported by Selionyi; (3) a similar summary of Orbeli's study of the visual reactions of the dog; and (4) a general summary of the results of the method. To give a complete account of the investigations of the St. Petersburg laboratory — for already more than forty papers have been published — would be possible only if each paper were dismissed with a sentence or two. We have preferred to consider two representative papers in some detail instead of mentioning several casually.

Description of the Salivary Reflex Method.

The salivary reflex (secretion of saliva) occurs under two strikingly different conditions: (*a*) when the mouth is stimulated by certain chemical processes (the specific stimuli for secretion); and (*b*) when the animal is stimulated by sights, sounds, odors, temperatures, touches which have been present previously in connection with stimuli of the

nomènes nerveux complexes dans le travail des glandes salivaires).' *Arch. intern. de physiol.*, T. 1, pp. 119–135, 1904.

2. Pawlow, J. P., 'The scientific investigation of the psychical faculties or processes in the higher animals' (The Huxley lecture, 1906). *Lancet*, 1906, pp. 911–915. The lecture is reported in part in *British Med. Jour.*, 1906, pp. 871–873, and in *Science*, N. S., Vol. 24, pp. 613–619, 1906. In justice to Professor Pawlow, it should be stated that *Lancet* alone gives the reader an adequate knowledge of the structure and materials of the address. It is deplorable that neither the *British Medical Journal* nor *Science* states that the lecture is published in condensed form.

3. Nicolai, G. F., 'Die physiologische Methodik zur Erforschung der Tierpsyche, ihre Möglichkeit und ihre Anwendung.' *Jour. f. Psychol. und Neurol.*, Bd. 10, S. 1–27, 1907.

4. Nicolai, G. F., 'Das Lernen der Tiere (auf Grund von Versuchen mit Pawlowscher Speichelfistel).' *Centralblatt f. Physiol.*, Bd. 22, S. 362–364, 1908.

5. Selionyi, G. P., 'Contribution to the study of the reactions of the dog to auditory stimuli.' Dissertation, St. Petersburg, 1907. Pp. 125 (in Russian).

6. Orbeli, L. A., 'Conditioned reflexes resulting from optical stimulation of the dog.' Dissertation, St. Petersburg, 1908. Pp. 111 (in Russian).

first class. The environment of the dog[1] may be said to consist of two sets of properties, the essential and non-essential. Essential, for a given reaction, are those stimulating properties of an object which regularly and definitely determine that reaction of the organism; non-essential, for the reaction in point, are those properties of an object which only in a highly variable and inconstant manner condition the reaction. The chemical property of food, whereby it acts upon the receptors of the mouth of the dog, is an 'essential' property, for it invariably causes a salivary reflex. The appearance of the same food — its lightness, color, etc. — is a 'non-essential,' for it may or may not cause the reflex. Pawlow has termed reflexes in response to 'essential' properties 'unconditioned,' and those in response to 'non-essential' properties 'conditioned.'[2]

It was Pawlow's idea that the perfectly constant and dependable 'unconditioned' salivary reflex might be used to advantage as a basis for the investigation of those complex nervous processes one of whose expressions is a 'conditioned' reflex of the same glands. Since many, if not all, changes in the nervous system gain expresssion in one way or another, through the salivary reflex, why not, Pawlow asks, investigate these processes by observing their relation to this particular reflex? That there was nothing novel in this idea is evident when we recollect that numerous reflexes have been used, by other investigators, for the study of psychic reactions. Respiration, heart-beat, and certain secretory changes have been studied, in this connection, with varying success. But what Pawlow may claim, apparently, is the discovery of that particular reflex which seems to be best adapted for the investigation of complex nervous processes.

The technique of the method we shall describe, with the help of two figures which have been re-drawn from Nicolai. The first of these figures represents a dog prepared for experiments in accordance with the method used in St. Petersburg. The second of the figures represents the modification of experimental technique which has been devised by Nicolai in Berlin.

[1] Throughout this discussion we shall deal only with the dog, in as much as it has been used for all of the Russian investigations. According to Nicolai a mixed race of hunting dogs has been used in most instances.

[2] Conditioned and unconditioned are the terms used in the only discussion of this subject by Pawlow which has appeared in English. The Russian terms, however, have as their English equivalents conditional and unconditional. But as it seems highly probable that Professor Pawlow sanctioned the terms conditioned and unconditioned, which appear in the Huxley Lecture (*Lancet*, 1906), we shall use them.

The experimental procedure is as follows. A normally active and healthy dog of vigorous salivary reaction having been selected, the duct of one of the salivary glands — the parotid for example — is exposed on the outer surface of the cheek and a salivary fistula is formed. The wound heals completely within a few days and the dog exhibits no signs of discomfort or inconvenience. Those who have used the method insist, indeed, that their animals are perfectly normal in all respects. In further preparation for the study of the salivary

FIG. 1.

reflex a small glass funnel is fastened over the opening to the duct with Mendelejeff cement. To this funnel is attached a tube which conducts the saliva to a graduate.

Three methods of measuring the quantity of saliva secreted are in use. (1) As the secretion flows from the tube into a graduate the drops are counted, and if the experimenter so desires, an additional measurement may subsequently be obtained by readings from the scale of the graduate. (2) The saliva is permitted, as Fig. 1 shows, to flow through a short tube into a graduate bottle and the amount of the secretion is then determined by reading the scale on the bottle. This method necessitates the replacing of the partially filled bottle by a clean one and the careful cleaning of the funnel between experiments. (3) A small metal canula, inserted in the duct of the gland, is connected by a heavy walled rubber tube with a small glass tube. The saliva drops from this tube upon the lever of a Marey tambour, as is shown in Fig. 2. As it falls drop by drop upon this lever a record is made

upon a smoked drum. From this record the experimenter may read the quantity of the secretion in drops and the rate of flow, *i. e.*, how many drops fell in a given interval. This graphic method of recording the salivary reaction is Nicolai's improvement on the Pawlow method as used in Russia. In addition to enabling the experimenter to obtain more detailed and accurate data concerning the reaction, it has the important advantage of permitting him to withdraw from the experiment room during the experiments. This is desirable because his presence is likely to influence the dog in unexpected and undesirable ways.

The Pawlow method lends itself readily to the investigation of many psychic reactions. In order to get clearly in mind the remaining essential points of experimental procedure we may consider its application to the study of visual discrimination of colors. A dog, which has been selected for observation and in which a salivary fistula has been created, is subjected to a course of training to establish a 'conditioned' reflex on the basis of visual stimulation. This is accomplished by showing the animal a particular color— say green —at intervals and at the same time giving it food. After numerous repetitions of this procedure the visual stimulus becomes the sign of food and induces the salivary reflex in the absence of the food. An animal so trained is ready for experiments on the discrimination of colors. If it appears that no color except green produces the 'conditioned' reflex, there is reason to believe that the dog perceives green as distinct from the other colors.

Pawlow devised and employs this method not for the study of psychic phenomena, as Nicolai proposes to do, but simply as a means of approach to the physiology of the nervous system. Of his insistence upon the objective point of view the following quotation from his Huxley lecture is excellent proof. "Up to the present time the physiology of the eye, the ear, and other superficial organs which are of importance as recipients of impressions has been regarded almost exclusively in its subjective aspect; this presented some advantages, but at the same time, of course, limited the range of inquiry. In the investigation of the conditioned stimuli in the higher animals, this limitation is got rid of and a number of important questions in this field of research can be at once examined with the aid of all the immense resources which experiments on animals place in the hands of the physiologist. . . . The investigation of the conditioned reflexes is of very great importance for the physiology of the higher parts of the central nervous system. Hitherto this department of physiology has

throughout most of its extent availed itself of ideas not its own, ideas borrowed from psychology, but now there is a possibility of its being liberated from such evil influences. The conditioned reflexes lead us to the consideration of the position of animals in nature: this is a subject of immense extent and one that must be treated objectively."[1]

Although psychology — or rather psychologists — deserves all of the criticisms which the physiologists have made, students of animal behavior and comparative psychology should not allow Pawlow's attitude to discourage them. Nor should they be slow to appreciate the immediate importance, and promise for the advancement of their science, of the Pawlow method and its results. That it can be used to advantage by animal psychologists, as well as by those physiologists for whom the psychic phenomenon is merely an unescapable nuisance, is obvious.

Already Nicholai has ably discussed the relations of the method to psychological problems. He contends, with reason, that the salivary reflex method possesses the four essential characteristics of a scientific method in psychology: (*a*) it is general, in its applicability to the study of psychic processes; (*b*) it is constant; (*c*) it permits accurate measurement; and (*d*) it is specific.

Undoubtedly the method may be applied to the study of various aspects of sensation and the mutual relations of sensations, to memory and ideation, to the formation of judgments and will acts. Its obvious limitation appears in the number of organisms with which it may be employed. Evidently it can not be used for the study of animals which lack salivary glands, and even among those animals which do possess these glands there are many which surely would not lend themselves satisfactorily to the method. It seems, therefore, as if Pawlow's method were especially important in animal psychology as a means to the intensive study of the mental life of a limited number of mammals. The dog evidently is especially well suited to the experiments.

Selionyi's Study of Auditory Reactions.

With this brief general sketch of the method and its purposes in mind we may turn to the investigation reported by Selionyi. In order, we shall state the problem, the principal points of method, and the results of his study of the auditory reactions of the dog.

The initial purpose of the work was to determine, by means of one form of the Pawlow method, how great must be the difference in the quality or the intensity of two auditory stimuli in order that they

[1] *Lancet*, 1906, p. 915.

shall produce perceivably different effects upon the auditory apparatus of the dog. The problem as it presented itself to the investigator was primarily one of the physiology of the nervous system, and secondarily one of animal psychology.

Starting with the familiar fact that sounds which have been associated with food may under certain conditions stimulate the salivary reflex, Selionyi first of all, as a necessary preliminary to his research, attempted to ascertain whether certain unusual or unfamiliar sounds, as well as those which have become familiar through their association with food, cause the secretion of saliva. He discovered that only 'familiar' sounds — those which the dog has learned to recognize as significant — have this effect as a rule.

No dogs were used for the investigation whose salivary reaction was not vigorous. An animal after having been tested for its normal reaction and prepared for the experiments by the creation of a salivary fistula, was trained until a definite 'conditioned' reflex appeared in connection with some particular sound. Repeatedly, in the training experiments, this sound was produced near the dog at the instant food was given. Sometimes the two stimuli were presented simultaneously; sometimes the sound preceded the food by five to thirty seconds. The combined action of the stimuli was permitted to continue for thirty to sixty seconds. This procedure was repeated at intervals of ten to thirty minutes, on a number of different days, until the sound, when given alone, would rapidly bring about the secretion of saliva. This usually occurred after twenty to forty repetitions. A particular sound — of definitely determined pitch, intensity, and quality — was thus rendered significant and 'familiar.' It now differed from other distinguishably different sounds in that it had its specific salivary reflex, whereas they caused no reaction.

During these training tests it is extremely important, Selionyi points out, that the experimenter make no unusual movements or otherwise produce conditions which may regularly and markedly stimulate the dog, else these irrelevant stimuli may become associated with food and spoil the result of the training experiment. In all of the experiments the experimenter has to guard against irregularities of condition. If he moves too quickly or if he holds himself too rigidly quiet, as the inexperienced worker is likely to do, the dog is disturbed and the salivary reaction modified.

The sounds whose influence was carefully observed by Selionyi were produced by an organ, by organ pipes, and by two whistles one of which (a tuning pipe) gave a number of tones of different pitch and the other a rattling sound.

A dog whose normal salivary reaction had been carefully observed and in which the habit of responding to a certain sound had been developed was placed in an apparatus similar to that of Fig. 2. The 'familiar' sound was then produced and the reaction noted. The experimenter took account of both the quantity and the quality of the saliva. A quantitative expression for the former was obtained either by counting the drops as they left the fistula or by measuring the secretion in a graduate. The quality (viscidity) was determined by

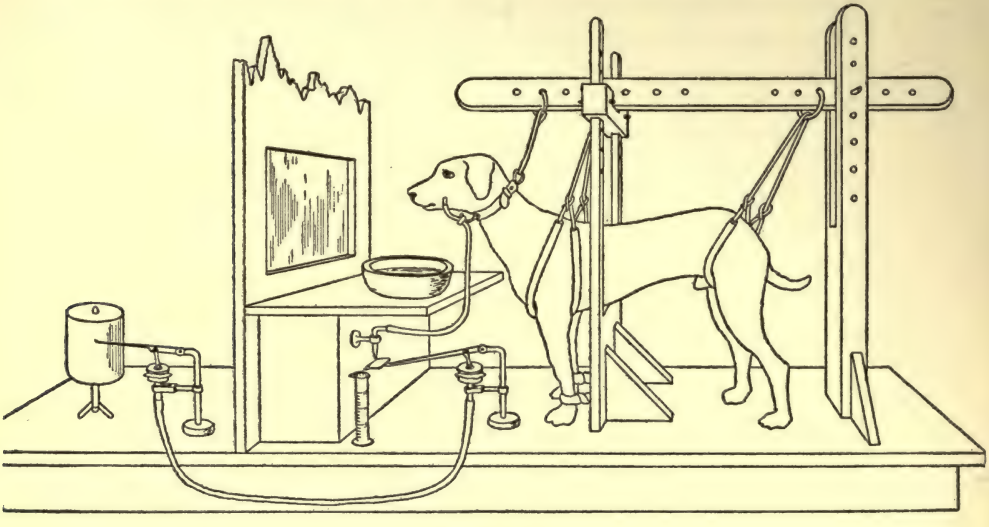

FIG. 2.

a measurement of the rate of flow through a capillary tube. Some ten minutes after the 'familiar' sound, an 'unfamiliar' sound whose influence upon the reaction the experimenter wished to discover, was given in the same way, and the reaction was again observed. After another interval, the 'familiar' sound was repeated. Thus, for the purpose of comparison, the observer obtained reactions to both kinds of stimuli in rapid succession. The experimenter noted the interval (latent period) between application of a stimulus and the appearance of the first drop of saliva, and he collected and measured the saliva which was secreted between stimulations as well as immediately after the application of each stimulus.

The sample record reproduced herewith will serve to illustrate the results obtained by this procedure.

TABLE.

EXPERIMENT 54. 'MARGARET.'

Familiar sound, A, of Tuning Pipe. Unfamiliar sound, A, of Tuning Pipe and 'Rattling' Whistle.

Time.	Sound.	Duration of Stim.	Quantity of Saliva in Drops.
4:25	Unfamiliar	1′ 40″	0
4:55	Familiar	30″	15
5:05	Familiar	20″	5
5:19	Unfamiliar	2′ 15″	0
5:29	Familiar	30″	9

In order to render a translation of Selionyi's summary of results intelligible it will be necessary to define a number of the terms which he employs.

A 'conditioned reflex' is a reaction (salivary in this case) to a stimulus which is only secondarily and indirectly a condition of the reflex. (For example, the sight of meat may produce a 'conditioned' salivary reflex.)

An 'unconditioned reflex' is a reaction to a stimulus which regularly and constantly conditions the reflex. (For example, food placed in the mouth causes an 'unconditioned' salivary reflex.)

A 'familiar' stimulus (sound, in this investigation) is one which experience has taught the animal to respond to as if it were the precursor of food. It is in fact a sound which produces a 'conditioned reflex' ordinarily.

An 'unfamiliar' stimulus is one which the animal has not been trained to respond to.

A 'fundamental reflex' is one which is caused by a 'familiar' sound.

An 'additional reflex' is one which is caused by an 'unfamiliar' sound which differs from the 'familiar' sound only in pitch.

A 'partial reflex' is one which is caused by some part of a complex 'familiar' sound. As, for example, when one tone of a 'familiar' chord causes a reflex.

In reading the summary of Selionyi's results it is important that the reader remember (1) that conditioned reflexes die out with repetition. (2)That edible subtances, when used as stimuli repeatedly, produce a constantly diminishing secretion of saliva, whereas inedible substances, when used repeatedly, produce a constantly increasing secretion. (3) That the secretion in response to edible substances increases as the interval between stimuli is lengthened, whereas the secretion to inedible substances diminishes as the interval is lengthened. Selionyi states that he made use mostly of edible substances. He did, however, at times make use of weak acid solutions as a substitute for food.

1. Separate sounds are received by the auditory apparatus of the dog as distinct stimuli even when they differ from one another by only a quarter of a tone.

2. Sounds which differ from one another only very slightly in quality are received as distinct stimuli.

3. A conditioned reflex of definite intensity is specific of (results from) a sound ('familiar') of a given pitch which has become its stimulus.

4. 'Unfamiliar' sounds which differ from the 'familiar' sound by a slight variation in pitch, produce in some dogs 'additional' reflexes which are much less intense than the reflex to the 'familiar' sound.

5. Even comparatively slight changes in the quality of 'familiar' sounds result in a diminution and disappearance of the fundamental salivary reflex.

6. Sounds which differ from one another very little in pitch (the quality and intensity remaining constant) may become the stimuli for the secretion of saliva of different degrees of viscidity: some cause the flow of liquid saliva; others, of viscid saliva.

7. The specificity of conditioned reflexes for the sounds which induce them may persist for two months.

8. Diminishing the strength of the 'familiar' sound causes the weakening or even the complete disappearance of its conditioned reflex.

9. A 'familiar' sound, which very gradually reaches such an intensity that a conditioned reflex would ordinarily result from it, fails to call forth its reflex if it was too weak at the beginning.

10. Separate components of a complex sound which conditions a 'fundamental' reflex, will produce reflexes (the so-called partial reflexes) at a certain relative intensity.

11. The intensity of partial reflexes depends upon the relative intensity of the sounds by which they are induced. The more intense the partial sound, the stronger is the partial reflex. A single tone of a familiar chord of three tones, of the same quality and intensity, produces a less intense partial reflex than do two tones of the same chord.

12. Each partial sound has its specific partial reflex just as each 'familiar' tone has its fundamental reflex.

13. The substitution of an irrelevant tone for one element of a 'familiar' chord tends to inhibit the reflex.

14. The addition of an irrelevant sound to the 'familiar' sound tends to inhibit the conditioned reflex.

15. The degree of inhibition is directly related to the intensity of the new or inhibiting sound.

16. Simultaneous stimulation by two sounds, each of which produces, when alone, the conditioned reflex (in connection with a non-conditioned reflex which is induced by the same food substance) brings about different results according to the character of the sound. In some cases the reflex which is thus produced is equal in intensity to the reflex caused by one of the two sounds; in other cases it is of considerably less intensity.

17. Under certain conditions of excitability or permanency, a conditioned reflex which has been worn out by repetitions may spontaneously reappear at the end of the interval which separated the previous repetitions.

18. The statement that a worn-out conditioned reflex may be restored by any unconditioned stimulus must be recognized as false.

19. The wearing out, by repetitions, of a fundamental reflex to a particular sound tends also to weaken the reflex to a second sound, which occurs in connection with the same non-conditioned reflex as the first sound.

20. The wearing out of an 'additional' reflex causes a slight weakening — in an acute experiment — of the fundamental reflex with which it is associated.

21. The wearing out of a fundamental reflex — in an acute experiment — causes a complete loss of the additional reflex which is associated with it.

22. The wearing out of a partial reflex — in an acute experiment — causes some weakening of the fundamental reflex.

23. The wearing out of one partial reflex causes the wearing out of another of the same intensity as the first. This phenomenon is observable in an acute as well as in a chronic experiment (at least in those cases in which the partial sounds are of the same quality).

24. By subjecting additional and partial reflexes to wear by repetition in a chronic experiment, and by simultaneously reinforcing the fundamental conditioned reflex by means of a non-conditioned reflex, it is possible to destroy completely the additional and partial reflexes while retaining the fundamental reflex in its full original intensity.

25. The independent restoration of two partial reflexes which have disappeared in a chronic experiment by reason of the repetition of one of them comes about differently. At the time when the partial reflex which was subjected to the influence of repetition has not yet reappeared the other partial reflex is fully expressed.

26. 'Unfamiliar' sounds which differ from a 'familiar' sound only very slightly in pitch, when given before the 'familiar' sound tend to inhibit its reflex.

27. A 'familiar' sound, the conditioned reflex of which has been worn out, produces an inhibitory effect upon the unworn reflex of another 'familiar' sound, when it is given simultaneously with the latter sound.

Orbeli's Study of Visual Reactions.

This investigation embraced five important phases of visual stimulation: (1) Color perception; (2) brightness perception: (3) size perception; (4) form perception; and (5) movement perception.

The method of determining the value of the salivary reaction was the same as Selionyi employed, that is, the drops of saliva were counted. The visual stimuli were presented, one at a time, upon a screen in front of the dog. Images of various colors (red, yellow, green, blue, and violet were used), intensities, sizes, and forms were projected upon this screen from the side opposite the dog by means of a lantern which focused the light upon the screen. Colored images were obtained by interposing, between the source of light and the screen, plates which acted as ray filters. The size and form of the area of the screen which was illuminated was determined by the interposition of plates whose openings varied in those respects. The movement stimuli were presented by causing the illuminated area of the screen to move in a given direction for a certain distance. The apparatus was so arranged that the experimenter, by merely squeezing a bulb, could cause a given visual stimulus to appear on the screen before the dog or to disappear.

The author's description of his method is not sufficiently precise and detailed to furnish the reader with adequate information.

In presenting Orbeli's results concerning the sense of vision in the dog, it seems fair to remark that they are not as precise and as valuable quantitatively as might have been obtained by the employment of more accurate and refined methods of stimulating the animal.

The importance of Orbeli's conclusions with reference to the visual capacities of the dog is so great that we herewith offer a translation of the summary with which his interesting paper ends.

1. A study of conditioned salivary reflexes furnishes no indication that rays of light of different wave-length are received as distinct stimuli by the eye of the dog. Conditioned salivary reflexes are always determined by changes in the intensity of light independently of its composition (quality).

2. A conditioned reflex may be produced by either increasing or decreasing the general illumination, and by the appearance of light figures on a dark background, or of dark figures on a light background.

3. Conditioned reflexes resulting from optical stimulation are essentially dependent upon the intensity of the photic stimulus.

(*a*) In many instances the importance of the intensity of the light becomes apparent quickly, for a much greater secretory effect results from a stronger stimulus.

(*b*) In the case of a certain degree of sensibility in a dog, even weak photic stimuli may produce so great an effect that more intense stimuli will not produce a greater reaction.

(*c*) Strong photic stimuli may bring about a pronounced reaction even when a weak stimulus has lost its influence by repetition.

4. The intensity of a photic stimulus depends not only upon the degree of change in light intensity, but also upon the size of the illuminated or shaded area. These two factors may compensate for one another.

5. Visual conditioned reflexes show clearly that it is characteristic of nervous tissue to respond more actively to an intermittent stimulus than to a continuous one.

6. Conditioned reflexes indicate that it is characteristic of the nervous system to enter upon a condition of excitability at the moment of the application of the stimulus, and to respond to brief single stimulations by a continued reaction. The tendency to react in this manner is especially marked, in the formation of a conditioned reflex, when the beginning of the photic stimulation coincides exactly with the beginning of the unconditioned reflex.

7. Qualitative [it is to be noted that this does not refer to color] differences in photic stimuli are determined not only by the fluctuations of the intensity of the light, but also by the specific grouping of the illuminated and the dark retinal elements (*i. e.*, by the form of objects).

(*a*) Early in the formation of a reflex the significance of form is indefinite and the reflex is determined wholly by the appearance of a light or a dark figure.

(*b*) Later the importance of the definite grouping of light and shadow (form) gradually becomes apparent. This specialization in the reflex is developed slowly.

(*c*) It is possible, in a short time, to produce a marked difference in the influence of two figures by systematically weakening the reflex to the unfamiliar figure and by reinforcing the influence of the familiar figure by the use of food.

(*d*) Rendering different the influences of a familiar and an unfamiliar figure produces conditions which greatly favor the improvement of discrimination of the familiar from the unfamiliar figure. Under these circumstances unfamiliar figures retain their independence to a certain extent.

(*e*) The different effects produced by various figures depend not upon quantitative differences (intensity of light), but upon qualitative differences, that is, upon the unequal or dissimilar grouping of simultaneously stimulated retinal elements.

8. When a difference in the effects of a familiar and an unfamiliar figure has been established, intensification of light, increase in the area of the figure, and repetition of the stimulus do not increase the effect produced by the unfamiliar figure.

9. When a difference in the effects of a familiar and an unfamiliar figure has been established, and the unfamiliar figure produces only a slight effect, its influence may be considerably increased by the introduction of irrelevant stimuli.

10. Moving objects may act upon the eye of the dog as distinct stimuli. In this case the direction of movement may determine the qualitative difference of stimulation and modify the reaction of the dog.

(*a*) In the early stages, after a conditioned reflex to movement has been established, the direction of the movement is not important and a familiar direction will have the same effect as an unfamiliar direction of movement.

(*b*) A distinct difference in the influence of movements varying in direction may be produced in a short time (by the process of wearing out the reflex to one stimulus by repetitions, and of reinforcing the other by giving food in connection with the stimulus).

11. The differences in the effects of different figures, and of movements of various direction, is apparently based upon the establishment of a conditioned inhibition. Stimulation of some regions of the retina establishes among the various groups of retinal elements the same sort of relation which obtains between the separate receptors of the entire organism.

Laws of Conditioned Reflexes and Conclusions concerning the Relative Importance of the Senses of the Dog.

The work in Pawlow's laboratory has rendered it possible to formulate a number of laws concerning the conditioned reflex. We shall mention only three of the most important of these, as examples.

Law I. A conditioned reflex can be worn out or destroyed by repetition of its conditioning stimulus or stimulus complex. Whereas at first a particular sound, sight, or odor which is indicative of food causes the secretion of several drops of saliva, after a few repetitions at short

intervals and without the presentation of food to the dog it causes no secretion. This wearing out of the conditioned reflex serves to distinguish it from the unconditioned reflex.

Law II. The destruction of a conditioned reflex by repetition does not influence other conditioned reflexes. For example, the wearing out of the conditioned reflex to the sight of a particular kind of food leaves unmodified the reflex to the odor of the food.

Law III. Irrelevant stimuli (a sudden noise, a new object in the environment, etc.), produce a depressing effect upon conditioned reflexes. In regard to the nature of their influence, they may be conveniently classed in two groups: (1) those that temporarily diminish or even suspend the activity of the conditioned reflex, but lose this retarding effect after a few repetitions; (2) those which at first tend to reduce the intensity of the reflex and finally inhibit it completely.

Many other laws of importance for investigators who wish to make use of the salivary reflex as a means of studying animal behavior are to be found in the various papers mentioned in the bibliography at the end of this article.

Nicolai, in summing up the results of the investigations concerning the senses of the dog, mentions the following interesting points:

1. Cold, which when applied to a particular spot on the skin in the dog calls forth a conditioned reflex, has a like effect when applied to another region of the skin. Localization apparently is not precise.

2. Mechanical stimuli, which when applied to a particular region of the body cause conditioned reflexes, do not have this effect when applied to other regions. In this case localization is fairly precise.

3. Warmth stimuli are distinguished by the dog from cold stimuli and both of these are distinguished from mechanical stimuli, such as tickling, scratching, rubbing.

4. The dog's hearing seems to be very well developed. To markedly different tones or noises specific salivary reflexes are given, after training. But when a sound differs only slightly, in pitch for example, from the 'familiar' tone it may cause merely a quantitative change in the reaction. If to a particular 'familiar' tone a dog reacts by the secretion of ten drops of saliva, to one a quarter of a tone higher it may respond with only eight drops, to one a half tone higher with four drops, to one a full tone higher with only one drop, while greater differences may cause no visible reaction.

5. Nicolai, like Orbeli, has failed to obtain evidences of color vision in the dog. Of the difficulties and dangers of error in the investigation of this subject the following observation is a significant indi-

cation. Nicolai discovered that a dog which was apparently able to distinguish green from red was in fact depending for its means of discrimination upon a slight difference in the action of the two different keys which were used to give the stimuli. Color had nothing to do with the reactions. For the human observer the stimuli which served to control the behavior of the dog were practically imperceptible. Evidently, visual stimuli which effect us very differently are the same for the dog; whereas certain other forms of stimulation which are for us insignificant are readily distinguished by the dog.

6. We obtain no quantitative expression of the value of the brightness, size, form, or movement perception from the papers on the visual reactions of the dog, but the presence of these several kinds of visual ability is demonstrated.

7. Two stimuli may be compared as to intensity (stimulating value) by comparison of the amounts of saliva which they cause to be secreted.

8. Comparison of stimuli of different sense modes indicates that the following is the order of diminishing importance for the dog: Smell, hearing, cutaneous sense (mechanical stimuli), vision, temperature senses. The dog is preëminently a nose-animal. Indeed, so acute is the sense of smell that it has thus far proved impossible to study it to advantage. Our color vision may enable us to teach the dog to distinguish colors, but he is in a position to give us instruction in smelling!

Finally we may be permitted to quote from Nicolai his conclusions concerning the relation of the Pawlow method to animal psychology.

"The Pawlow salivary reflex is a relatively complicated process which is connected only indirectly with the exciting stimulus and for the occurrence of which the idea of eating is always necessary."

"Pawlow's salivary reflex method gives us a better explanation of the manner in which a dog learns spontaneously [than do most other methods], but it remains to be shown how far the learning can be carried. In the solving of related questions, the method does not seem to be superior to Kalischer's training method, and the latter is much the more convenient."

"One can show experimentally that a dog learns by subsuming certain new ideas under general ideas which he has already acquired in the course of the experiment."[1]

[1] *Centralb. f. Physiol.*, Bd. 22, S. 364, 1908.

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PSYCHOLOGICAL LITERATURE.

LITERATURE OF THE PAST YEAR ON THE BEHAVIOR OF LOWER ORGANISMS.

Protozoa.

It is well known that the protozoa take in various sorts of indigestible substances in the process of feeding and it is generally assumed that they exercise no choice whatever in this process. The observations of Balbiani on *Didinium* (1873) contradicting this assumption have been shown to be erroneous, and the validity of those of Hodge and Aikins on *Vorticella* (1895) and those of Metalnikow on *Paramecium* (1907) leading to the same conclusion have been seriously questioned.

In view of these facts we welcome the recent thorough work of Schaeffer[1] on this subject, reported at the last meeting of the American Society of Zoölogists at Baltimore.

Schaeffer allowed a mixture containing *Euglena viridis*, *Phacus triqueter*, *Trachelomonas volvocina*, potato starch grains, particles of sand and other small bits of substance, to fall from a capillary pipette onto the disk of an attached *Stentor* and found that the organisms were invariably swallowed, while the starch, sand and débris were rejected. He also found that when the organisms became nearly satiated they consistently rejected *Trachelomonas* while they still took *Euglena*, and is of the opinion that under certain conditions some individuals of *Euglena* are selected and others rejected. *Euglena* killed by heating, or by means of various chemicals, if thoroughly washed, were taken quite as readily as living specimens. This led the author to conclude that selection is due to tactile rather than to chemical stimuli.

In studying the behavior of *Didinium* Mast[2] also found a sort of food selection. In the presence of various organisms these hunter ciliates were found to attack various species of *Paramecium*, *Colpoda*, *Colpidium*, *Vorticella*, *Frontonia* and *Nassula*, but not *Stentor*, *Euglena*, *Spirostomum*, *Oxytricha* and several others.

[1] Schaeffer, Asa, 'Selection of Food in *Stentor cœruleus*'; abstract, *Science*, N. S., Vol. 29, p. 425.

[2] Mast. S. O., 'The Reactions of *Didinium nasutum* (Stein) with Special Reference to the Feeding Habits and the Function of Trichocysts,' *Biol. Bull.*, Vol. 16, pp. 91–118.

Didinium swims about rapidly and consequently comes in contact with other organisms and objects that may be present. Under certain conditions a rod-like structure known as the seizing-organ, becomes attached to the organisms with which they come in contact. The seizing-organ then travels to the posterior end of the *Didinium* and the prey is swallowed. "The apparent choice of food is due to the fact that the seizing organ will adhere to the surface of some organisms and not to that of others. The *Didinia* come in contact with all sorts of objects in their random swimming and attempt to swallow all of those to which the seizing organ will adhere" (p. 118). The adhesion of the seizing organ to the surface of some organisms and not to that of others may however be due to chemical or tactile stimuli. The seizing organ does not adhere every time the *Didinia* come in contact with organisms upon which they feed; they seem to have some method of controlling this process.

Didinia feed primarily on *Paramecia*. They can swallow organisms ten times their size and consume several a day. When the *Paramecia* are attacked they throw out masses of trichocysts which frequently force the enemy back and break the connection, so that the prey escapes. This demonstrates a protective function of the trichocysts.

"One cannot work long with this unicellular form without being deeply impressed with the complexity of its structure as well as with its unique habits. The differentiation of the seizing organ with its highly specialized function is remarkable in an organism consisting of a single cell" (p. 111).

Echinoderms.

Two contributions to the behavior of the echinoderms have appeared during the year, one by Pearse dealing with the general behavior of the holothurian *Thyone*, the other by Bohn dealing with the reactions to light in starfishes and ophiuroids.

Pearse[1] gives a very interesting account of the various activities of *Thyone*— locomotion, burrowing, feeding, respiration and response to various stimuli. He finds that while these organisms respond very definitely by contraction, when subjected to slight tactile stimuli or when the light intensity is slightly decreased, they soon become acclimated to such conditions and no longer respond.

"Perhaps the most interesting point which is brought out in the study of *Thyone's* behavior is the fact that, although the symmetry is

[1] Pearse, A. S., 'Observations on the Behavior of the Holothurian, *Thyone briarens* (Leseur),' *Biol. Bull.*, Vol. 15, pp. 259–288.

so strikingly bilateral, the locomotion is carried on with the same lack of orientation which is so characteristic of other groups of echinoderms" (p. 287). This feature in the behavior of *Thyone* is clearly brought out in its reactions to light. It moves from the surface most highly illuminated no matter which part of the animal is exposed. Thus, it may move with either end or any portion of the sides ahead.

Bohn[1] first describes in considerable detail the reactions to light and various other stimuli in *Asterias rubens* collected in various places, *e. g.*, under rocks, on sand bottom, among sea weeds, etc., and then briefly considers the reactions of seven other related forms in a comparative way.

Many of the results and conclusions presented are interesting and suggestive, but the evidence supporting them is frequently far from convincing owing largely to the methods employed. The author in all his work justly emphasizes the importance of making observations under natural conditions. In studying the reactions to light, *e. g.*, the observations were made on starfish in tide-pools where the shadows of rocks produced regions of different light intensity, or in aquaria exposed to light from a window with black and white screens variously arranged to regulate the intensity.

Such methods answer fairly well for rough qualitative work, but when they lead to conclusions such as the following one naturally begins to question the validity of the conclusions:

> Souvent les phénomènes se succédaient avec la même précision que les phénomènes astronomiques; dans maintes circonstances c'est avec une certitude absolue que j'ai pu prédire ce qui allait se passer (p. 12).
>
> Les diverses impulsions déterminées par les agents du milieu extérieur (lumière, gravitation . . . , excitants mécaniques) se combinent dans le système nerveux du disque, et il en résulte des mouvements, qu'après l'analyse que j'ai faite on peut prévoir à l'avance; l'animal, dans des conditions déterminées, suit infalliblement une certaine trajectoire: il n'est pas plus maître de modifier sa marche qu'un astre qui gravite autour d'un autre dans l'espace; il ne peut résister aux diverses impulsions ayant leur point de départ dans les agents externes (p. 59).

Something can undoubtedly be predicted regarding the movements of echinoderms under certain conditions. No one would be bold enough to deny that some reactions can be predicted even in organisms far more complicated than echinoderms. It is not difficult to predict the general movement of a human being when a revolver is thrust into his face by a figure behind a bull's-eye. The question is, how accurately and how extensively can the movements be predicted?

[1] Bohn, G., 'Introduction à la Psychologie des Animaux à Symétrie Rayonnée, II. Les Essais et Erreur schez les Étoiles de mer et les Ophiures,' *Bull. Inst. Génér. Psychol.*, VIII., pp. 1–86.

In spite of the author's statement quoted above regarding external stimuli he admits the importance of internal factors, but insists that there are no psychic phenomena. "Il est nécessaire toutefois de faire remarquer que les impulsions dépendent de certains facteurs internes, et non pas seulement de facteurs externes: il y a lieu de tenir compte des états physiologiques. . . . Mais il n'y a là dedans rien de psychique" (p. 60). We judge internal factors, the physiological states, in an organism largely by its variation in response to given external stimuli. There are as yet few other criteria. How then is it possible to predict movements which depend upon physiological states while these states are known almost entirely through such movements? And since we do not know of what the internal factors consist, is it not precisely as unscientific to say that there are no psychic phenomena involved as that there are? One is inclined to think that if the author had exercised more care in controlling his stimulating agents he would not have been so positive in his assertions that he had analyzed the reactions to such a degree that the movements can now be predicted.

Whether or not the starfish is able to modify its course depends upon what one considers the starfish to be. If the starfish is assumed to consist not only of the material composing it, but also of the chemical changes taking place in this material, it of course modifies its reactions, since the reactions according to the author depend upon internal changes, physiological states. What regulates the internal changes is a question concerning which little is as yet known, and any dogmatic statement regarding it as a whole is at present without foundation.

In view of these facts a bare statement comparing the movements of living organisms with those of planets, as in the quotation above, seems to be far fetched, since it is evident that the movements of the latter are independent of internal changes as long as the mass remains constant, whereas those of the former are not.

The author concludes that these organisms respond to constant intensity by orientation, 'tropisme,' and to a change of intensity by rotation, 'sensibilité différentielle'— "Avec Loeb, j'ai distingué nettement chaque *tropisme* de la sensibilité différentielle correspondante, l'un est fonction de i, l'autre de di/dt" (p. 56). Let us consider these two responses, (1) sensibilité différentielle and (2) tropisme.

1. The author says (p. 6), that it is to Loeb that we owe the idea of sensibilité différentielle, Unterschiedsempfindlichkeit, reaction to change of intensity of stimulus. Loeb, however, as far as I know, never claimed to have originated this idea. It formed the foundation

of the 'preference method' so extensively used by Bert, Graber, Lubbock, Romanes and others, years before Loeb began his work in this line. Naegeli (1860), Strasburger (1878), Stahl (1880), and Engelmann (1882) had also recorded specific reactions to sudden changes of intensity. Darwin (1880) states this idea clearly as follows: "We believe that this case," referring to an experiment of Wiesner, "as well as our own, may be explained by the excitement from light being due not so much to its actual amount, as to the difference in amount from that previously received" (p. 566). Ryder described the reaction of one of the serpulids to decrease of intensity in 1883, ten years before Loeb's paper referring to similar reactions appeared. What Loeb claims regarding the effect of change of intensity of the stimulus is that it differs from the 'tropisms.' This he pointed out in 1893 and several times since. As a matter of fact in his earlier papers he strenuously opposed the idea that difference or change of intensity is of importance in behavior.

I have found no organisms that fail to respond to changes of light intensity provided that they respond to light at all, and I have tested representative specimens ranging from the lowest to the highest. The fact then that the author finds a definite response to change of intensity in echinoderms is to be expected. The law however which he has formulated regarding the relation between these reactions and the so-called tropisms needs attention. This law is variously stated in different papers; the following is perhaps the clearest statement:

> Chez les animaux qui présentent un phototropisme positif, toute variation négative (diminution) de l'éclairement, portant sur toute l'étendue du champ lumineux, tend à produire immédiatement ou après un arrêt plus ou moins prolongé, le changement de signe du phototropisme; chez les animaux qui présentent un phototropisme négatif, c'est une variation positive (augmentation) qui a le même effet; la tendance provoquée par l'éclairement, dans l'un et l'autre cas, peut se réaliser complètement ou incomplètement (une seule rotation de 180 degrés, rotation successives, oscillations régulières ou irrégulières). Il applique non seulement aux animaux tubicoles et fixés, mais encore à ceux en train de nager, de marcher, de ramper. (Bohn, G., 'A propos de l'excitabilité par la lumière,' *Compt. rend. Soc. Biol.*, Vol. 63, p. 655.)

By positive phototropism, I judge that Bohn means that the animals go toward the source of light, and by negative that they go from it. According to his law, then, a decrease of intensity tends to make animals which go toward the light turn and go in the opposite direction, *i. e.*, it tends to make positive animals negative; and an increase tends to make negative animals positive. Strasburger as early as 1878 found precisely the opposite to be true in case of swarm-spores.

He demonstrated conclusively that if the light intensity is sufficiently increased when these organisms are positive, they become negative. I have since found the same to be true for Volvox, Euglena, Chlamydomonas, Trachelomonas, and several other forms. A reduction of intensity does produce a definite reaction, a shock movement, in these forms in the positive state, and such reactions regulate orientation, but they have nothing to do with the sign of orientation. The organisms remain positive and under certain conditions become even more strongly positive. On the other hand an increase of intensity, whether rapid or slow, produces no definite immediate response, no shock movement, in positive animals, but if long enough continued and sufficiently great it causes them to become negative. The change in the sign of reaction is probably due to some chemical change in the organism which is dependent upon the absolute intensity of light, not upon the time rate of change of intensity.

2. Tropisms. The author states that when the animals are exposed in a field of uniform light intensity they move either toward or away from the source of light, or they may take a position such that the most sensitive parts of the body are shaded. These reactions are considered to be the result of constant intensity and are therefore called 'tropisms.'

It is evident that, under the conditions of illumination referred to above, certain parts of the animals are in the shadows cast by other parts, and the movements of the animals, if they are not directly toward or from the source of stimulation, cause change in position of the shadows and consequently changes of light intensity on the organism. Is it not possible that the reactions of the star-fish in a field of uniform illumination are regulated by such differences and changes of intensity just as they are in unicellular organisms, *Euglena Stentor*, etc., under similar conditions? If it proves to be true that they are regulated thus, the fundamental distinction between 'tropisme' and 'sensibilité différentielle' as defined by Bohn falls to the ground. Light does undoubtedly affect the movement of organisms without change of intensity, but I have yet to find a single instance where it has been *demonstrated* that it regulates the process of orientation in organisms without image-forming eyes.

Trial and Error. — Bohn emphasizes again and again that the reactions of starfish and ophiuroids and various other forms are not in accord with the theory of 'Trial and Error' as defined by Jennings, and appears to consider this fatal to the theory. Bohn's conclusions are based largely upon the fact that the organisms studied orient directly

to light and respond in a fixed way to changes of intensity. He is astonished that Jennings has not referred to the reactions of starfish to support his theory. "Jennings aurait certainement dit qu'il y a là des 'essais successifs' dans diverses directions, et, comme dans bien d'autres cas, il aurait été victime d'une illusion" (p. 6). It is interesting to note that Jennings has made an extensive study of the reactions of a starfish, the results of which appeared at nearly the same time that the paper under consideration was published, and that, contrary to Bohn's prediction, he does not explain orientation by the application of the trial and error theory. Jennings has repeatedly stated that direct orientation, differential response to localized stimulation, is not in opposition to the 'trial and error theory' as applied in his study of reactions. He says in his book on *Behavior on Lower Organisms* (p. 307), "Reactions [which] show a definite relation to the localization of the stimulus . . . include perhaps the greater number of the directed movements of organisms."

Bohn finds that young starfishes orient more directly than older ones and offers this as an argument against the 'trial and error theory.' I fail to see the force of his argument. Had he found that the very first movements of embryos are more direct with reference to the localization of the stimulus than later movements, there might possibly be some ground for his argument. The smallest starfishes he mentions were however several centimeters in diameter. The fact that these orient more directly than older ones is as far as I can see not in opposition to Jennings' views as stated in his book.

The bare sweeping statement that "those who criticise the theory of tropisms show a double ignorance, (1) ignorance of the facts as they are; (2) ignorance of the ideas of J. Loeb" (p. 77), has in my opinion no value in science. If the author really thinks the critics of the 'tropism theory' ignorant of the ideas of Loeb and the facts, would it not be well for him to present the evidence which has led him to think thus?

The paper closes with a bibliography consisting of sixty-five titles, fifty-five of which bear the name of Bohn.

Crustacea.

A number of different crabs are known to fasten seaweeds and other objects to their carapace. A paper by Minkiewicz dealing with this phenomenon was reviewed in this Bulletin a year ago. In the review it was pointed out that the author had found that the objects selected by the crabs harmonized in color with that of the environment,

and it was maintained that he had demonstrated 'color vision' in these forms. We now have three additional short papers by the same author on related phenomena in other forms.

1. According to Minkiewicz[1] the color of the crab *Hippolyte varians* changes so as to harmonize with the background. The color changes are brought about by the interaction of three pigments, red, yellow and blue, found in the cells of the carapace. The blue pigment is permanently diffused throughout the cells, the red and yellow may contract or expand. On a red background, *e. g.*, the blue disintegrates and the red expands. On a green background the yellow expands but the blue remains, making the carapace green. In specimens with the eyes removed the blue acts normally but the red and yellow no longer expand, showing that the color changes are regulated by the direct action of light on the blue pigment, and the indirect action through the nervous system on the red and yellow.

The author considers the phenomena concerned in these color changes fundamentally identical with those concerned in disguisement referred to above. In the former exposed to red light, *e. g.*, the red pigment becomes positive and spreads out, in the latter under similar conditions the entire animal becomes positive to red and selects red objects to fasten to its carapace. In both cases the reaction is brought about through the retino-neural mechanism.

The fact that the color of *Hippolyte* changes so as to harmonize with violet, yellow and other colors which the animals do not experience in their natural environment, and the fact that the animal becomes blue in darkness, lead the author to conclude that these phenomena are of primary origin and are not acquired by natural selection.

It is impossible to judge as to the probable accuracy of the observations since practically nothing is given regarding methods.

The remaining two brief papers[2] deal with the reactions to different colors of *Pagurus*, a hermit crab. The author illuminated the two halves of an aquarium with light of different colors and placed the animals so that the two eyes were exposed to light of different colors and found that the creatures turned toward the color indicated by the arrows below, *i. e.*, in case of black and red in the aquarium

[1] Minkiewicz, R., 'Étude expérimentale du synchromatisme de *Hippolyte varians* Leach.' Ext. d. *Bull. d. l'Acad. d. Sci. d. Cracovie*, Nov., 1908, pp. 918–929.

[2] Minkiewicz, R., 'Sur le chlorotropisme normal des *Pagures*.' Nov., 1908. 'L'apparition rhythmique et les stades de passage de l'inversion expérimentale du chlorotropisme des *Pagures*.' Dec., 1908. *Compt. Rend. Acad. Sci.*

they went toward the red; in case of red and yellow, toward the yellow, etc., as indicated below.

black → red → yellow → blue → violet → green → white

If the crabs are kept in a jar and exposed to their own excreta for some time their reaction to colors gradually changes as follows:

Normal: red → blue → green
red → green → blue
green → red → blue
green → blue → red.

It is pointed out that these reactions cannot be due to intensity difference, since the light in the yellow is more intense than that in any other color.

These reactions appear to *demonstrate* 'color vision' in *Pagurus*, regardless of what philosophic attitude one may have toward an ultimate explanation of them.

Cowles[1] arrives at some interesting conclusions in his extensive study on the general behavior of the crab *Ocypoda*. He presents strong evidence showing that these creatures make use of the sense of smell and sight in locating food, that the tactile sense is well developed, that they "have memory, are able to profit by experience, and can form habits," but that they do not hear. He finds no evidence indicating that these animals distinguish colors, and is of the opinion that they do not see details in objects. Sight consists largely in distinguishing variation in brightness rather than in form.

The observations and experiments were nearly all made on animals in their natural environment. Those leading to the conclusion that the crabs have associative memory are especially worthy of mention.

Although these organisms live on the land it is necessary that they keep their gills moist. This they do by taking a definite position on the beach at a point such that the waves just reach them. The author found that in an enclosure containing a glass dish full of water the animals soon learned to take a similar position when the locomotor appendages came in contact with the glass and water; and later it was found that the same reaction was given when the glass was touched even if the dish was empty.

Holmes[2] in his study of the reactions of the fiddler crab to light has presented some interesting ideas regarding the question of orientation.

[1] Cowles, R. P., 'I., Habits, Reactions, and Associations in *Ocypoda arenaria*,' Pub. 103, Car. Inst. of Wash., 1908, pp. 1–41.

[2] Holmes, S. J. 'Phototaxis in Fiddler Crabs and Its Relation to Theories of Orientation,' *Journ. of Comp. Neurol. and Psychol.*, Vol. 18, pp. 493–497.

He found that this animal, especially when first brought into the laboratory, goes actively toward a source of light, but owing to its peculiar mode of locomotion it travels toward the light with one side ahead. The theories of Verworn, Loeb and Bohn demanding equal illumination of the photosensitive structures on opposite sides when organisms are oriented, are of course not applicable to this form.

Holmes concludes from this study, together with that on *Ranatra*, "that light is followed very much as an animal pursues any other object of interest, such as prey, or its mate, and until we can give a physiological explanation of these phenomena we are not in a position to give a satisfactory explanation of orientation to the direction of the rays of light." This conclusion, of course, applies only to animals with image-forming eyes.

Insects.

After a careful study of the reactions of *Drosophila* strongly stimulated by light, temperature, or irritating chemical vapors which cause various uncoördinated motor reactions, Carpenter[1] concluded that these reactions "may be regarded as an instance of trial and error behavior." "The escape of the insect from the region of stimulation appears to depend on chance."

He found that insects with one eye destroyed and consequently unsymmetrically stimulated, "crept in a fairly direct path toward the light." This result is similar to that obtained by Holmes with *Ranatra* and by Rádl with *Musca*. It shows that symmetrical stimulation is not necessary in orientation in these forms and opposes the tropism theory as defined by Loeb and Verworn and recently strongly advocated by Bohn.

Stockard[2] finds that the behavior as well as the structure of the 'Walking-stick' *Aplopus mayeri* is admirably adapted for protection against its enemies. These creatures remain perfectly quiet during long periods in daylight and move about at night. When touched they fall and cling to lower branches where they become perfectly quiet and concealed. When they move they swing from side to side slowly like a twig swayed by a gentle breeze. The different individuals are usually found on twigs which harmonize with them in color, — the males, which are greenish, among the leaves, the large dark-

[1] Carpenter, F. W., 'Some Reactions of *Drosophila*, with Special Reference to Convulsive Reflexes,' *Journ. of Comp. Neurol. and Psychol.*, Vol. 18, pp. 485–491.

[2] Stockard, C. R., 'II., Habits, Reactions, and Mating Instincts of the "Walking-stick" *Aplopus Mayeri*,' Pub. 103, Car. Inst. of Wash., 1908, pp. 43–59.

brown females on large dark stems, and the light-gray specimens on lighter colored stems.

These creatures swing the antennæ about much, apparently feeling their way as they move from place to place. If the antennæ are amputated the fore legs are used as feelers, and if these are removed and the specimens are blinded, either the right or the left leg of the second pair is brought into service as a feeler. This is a remarkable reaction in view of the fact that in normal specimens the legs are never used in this way.

The author found that males copulate normally with the posterior end of a female fastened to a stick. Kellogg (1906) obtained similar results in his study on 'Silkworm Moth Reflexes.' Stockard concludes (p. 59) that "such an experiment makes it evident that a courtship or psychical response is not essential between the two sexes in mating." While these experiments indicate that the process of copulation is largely reflex, I am unable to see that they have any bearing on the question of psychical phenomena.

Lower Vertebrates.

Coghill[1] removed *Diemyctylus* embryos from the eggs before there was any indication of response and studied the development of the reactions to tactile stimuli somewhat as Paton (1907) had done for fish embryos. The results of this study are interesting and suggestive, but they do not appear to warrant any very definite conclusions.

Parker[2] presents a thorough study of the reactions of *Amphioxus* to various stimuli, and concludes that these animals possess in potentia at least the sense organs of the vertebrates. The author suggests that the eye-cups in the nerve-tube, which are photoreceptors in *Amphioxus*, "represent the elements from which the rod- and cone-cells of the lateral eyes of vertebrates have been derived. The rod- and cone-cells of the vertebrate retina are inverted, not because they have retained a morphological position dependent upon an external origin, but because of their orientation acquired as effective eye-cups in the nerve-tube of a primitive vertebrate."

In his study of warning coloration Reighard[3] deals with much

[1] Coghill, G. E., 'The Reactions to Tactile Stimuli and the Development of the Swimming Movements in Embryos of *Diemyctylus torosus* Eschsholtz,' *Journ. of Comp. Neurol. and Psychol.*, Vol. 19, pp. 83–105.

[2] Parker, G. H., 'The Sensory Reactions of *Amphioxus*,' *Proc. Amer. Acad. Arts and Sci.*, Vol. 43, pp. 415–455.

[3] Reighard, J., 'IX., An Experimental Field-Study of Warning Coloration in Coral-Reef Fishes,' Pub. 103, Car. Inst. of Wash., 1908, pp. 257–325.

which is of interest to comparative psychologists. His object in this study was to explain the origin of the variegated patterns in the strikingly colored fish found among the coral-reefs at the Tortugas. He began this investigation by making a thorough study of the feeding habits of the gray snapper, a piscivorous fish which one would expect to feed on the colored fish in the reefs. It is this study which is of particular interest to psychologists.

It was found that the gray snappers take atherinas (a small fish used in the feeding experiments) killed in formalin and stained any color, but that they do not take these fish if cassiopea tentacles are fastened to them. In the presence of a mixture of red atherinas with tentacles and blue without, the snappers soon learned to avoid the red; and after some time they rejected the red specimens, some of which were lighter and some darker than the blue, even if no tentacles were fastened to them. This power of discrimination was still found in snappers twenty days after they had learned to reject the red atherinas.

These experiments, and many others, all of which show ingenuity in method, led to the following conclusions regarding the gray snapper:

1. Gray snapper discriminates colors, as was demonstrated for creek chubs by Washburn and Bentley.

2. Gray snapper discriminates form.

3. It forms associations and has memory.

4. It learns rapidly. To quote the author: "The gray snapper discriminates with great rapidity and delicacy between the various possible food elements of its environment, which are not conspicuously different from each other."

Some have objected to the conclusion concerning color-vision on the ground that the colors used were not pure. The red contained some yellow and green, while the blue contained some green. I can not understand the force of this argument. The experimental results seem to me to prove conclusively that the fish discriminates between light consisting largely of the longer waves and that consisting largely of the shorter, regardless of intensity.[1] If this be true it appears to justify the conclusions stated. Of course no one would be bold enough to conclude that the vision is or is not like that in man, since there is no way of determining even whether or not the sensation of a given color is the same in two human beings.

Regarding the question of Warning Coloration, the author concludes

[1] This proof rests primarily upon the fact that grey snappers trained to avoid red atherinas in the presence of blue atherinas do so no matter if the red are lighter or darker than the blue.

that the fishes in the reefs are conspicuous because the reefs have afforded them protection against their enemy to such an extent that natural selection has not operated to eliminate this characteristic. He offers a substitute for the theory of warning coloration known as '*immunity coloration*.'

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RECENT RESEARCHES ON THE BEHAVIOR OF THE HIGHER INVERTEBRATES.

I. TROPISMS.

After studying *Vanessa cardui*, *V. urticæ*, *V. io*, and *Satyrus janira*, Bohn[1] decides that the movements of these butterflies are the result of a triple orientation to the air, sun and gravitation. He found that, in pillaging flowers, the lines described by the head of each butterfly were arcs of circles arranged in three principal directions: (1) Rarely the body retains constantly the same direction and the head describes an arc on a meridian; (2) more often the body is displaced parallel to the light and the head describes an arc of a circle situated in a vertical plane; (3) usually the body is displaced, successively, on several azimuths and the head describes a circumference situated in a horizontal plane or in a plane inclined at various degrees to the horizon. In this last case, the body adjusts itself constantly to the wind and light. All of these butterflies are positively anemotropic and negatively phototropic, but the degree varies with different species, and the force with which the wings are moved is a function of the intensity of the illumination of the eyes. Hence, when the wind is blowing at right angles to the rays of the sun, the butterflies sidle across the direction of the wind. No investigation was made of the mechanism that brings about this orientation.

II. VISION.

Alex. Petrunkevitch's recent paper[2] on the sight of spiders is a morphological study yielding psychological results. By measuring the angles which the axes of the eyes make with the three reference planes of the body and with each other, by measuring the size of the eyes, by removing the eyes and mounting them under the microscope in

[1] Bohn, G., 'Observations sur les papillons du rivage de le mer,' *Bull. Inst. Gén. Psy.*, Vol. 6, pp. 285–300.

[2] Alex. Petrunkevitch, 'The Sense of Sight in Spiders,' *Jour. of Ex. Zool.*, Vol. V., 1907, pp. 275–310.

such a manner that images may be obtained through them, the author arrives at these valuable conclusions: (1) No pair of eyes is focused upon a common point; but the axes of the eight eyes are so arranged as to form divergent angles with each other. (2) The axes of the same eyes in different spiders do not lie in the same direction, but form, with the three planes of the body, angles differing considerably from each other but fixed for each species. (3) When the spiderling leaves the cocoon, the eye-axes have become fixed in the position which they will occupy during the whole life of the growing and mature spider. (4) The cephalothorax grows more rapidly than the eye group, so that the latter occupies, with each successive moulting, a relatively smaller part of the cephalothorax. (5) The larger the spider's eye, the sharper the vision or power of distinction. (6) The four pairs of eyes form four pairs of images differing in size; the larger eyes forming the larger images. (8) The more rods covered by the image, the more detail can be perceived by the eye. The spider perceives much less detail than man. (8) In all probability, the eyes form distinct images; because, first, the distortion in each eye is in an opposite sense to that of the other eye of the pair; second, the retina is not a plane, but a complicated form differing in different eyes and in different species.

Petrunkevitch thinks that spiders have color vision, but gives no new data to support the statement. In the lobster, according to Hadley,[1] reactions to colored lights are really reactions to different intensities of light.

III. Maternal Instincts.

Lécaillon[2] makes the following interesting contribution to our knowledge of the maternal instincts of spiders: When the cocoon becomes crowded, the female cuts a few silken strands with her jaws, thus allowing the cocoon to stretch and give more room to the inmates. This manipulation also admits more air. This attention on the part of the mother spider is just as essential and important as the incubation of eggs by birds or the suckling of babes by mammals. The young could not leave the cocoon unless aided by the female.

In a comparative study of American and European ants, Wheeler[3]

[1] Hadley, P. B., 'The Behavior of the Larval and Adolescent Stages of the American Lobster (*Homarus americanus*),' *Jour. of Comp. Neur. and Psy.*, Vol. XVIII., 1908, pp. 199–301.

[2] Lécaillon, A., "Nature et importance des 'soins' que certaines femelles donnent à leur progéniture." *Compt. Rend. Soc. Biol.*, t. LXIII., 1907, p. 668.

[3] Wheeler, W. M., 'Comparative Ethology of the European and North American Ants,' *Jour. f. Psy. u. Neur.*, Bd. XIII., 1908, S. 404–435.

discusses the nidification habits of ants. He agrees with Forel that the mounds are built for the purpose of securing more heat for the incubation of the young.

IV. Social Instincts.

Comstock's paper on the wall-bee[1] is of interest to the archæologist only. The bulk of Newell's first paper[2] on the 'New Orleans Ant,' consists of matter of economic rather than of psychologic value; however, it contains the following data bearing on the social instincts of that species: (1) The ant attends and colonizes the cotton louse and a mealy bug ('poo-a-pooche') infesting the cane. (2) Adjacent colonies often associate. (3) The ant will feed from the same honey dish with the hive bee and will even clean the latter without arousing any opposition. (4) In attacking stinging ants of their own size, they attempt to injure the tip of the abdomen; but in attacking large ants they rush up, bite a leg or an antenna, and then dart away.

Two papers that have appeared during the past year discuss the behavior of ants towards their guest insects. Newell[3] found two species of mites flourishing in the nests of the Argentine ant; but the ants were entirely indifferent to their welfare, neither removing them nor caring for them in any way. Wheeler[4] discusses the behavior of ants towards three inquilines; *Cremastochilus*, *Microdon* and *Hetærius*. *Cremastochilus* is a persecuted intruder that eventually becomes a tolerated guest. Wheeler thinks it a degenerated true guest, the instincts of which have become so degenerated by years of parasitism that it cannot return to a free life. The larval and pupal *Microdons* are indifferently tolerated guests, but the adult is a persecuted intruder. Towards *Hetærius* the behavior is unique. A study of seven *Hetæri* placed, with *Formica subsericea*, in a Janet nest revealed the following behavior: When an ant passes a *Hetærius*, the beetle waves its forelegs as if to attract attention. The ant stops and feels it with its antennæ. Sometimes she seizes the beetle by the leg and carries it about the nest. At other times she grasps it with her fore feet, holds it in a vertical position and licks its head in a quick, effusive manner. For a while the beetle keeps its head withdrawn into its thorax. Sud-

[1] Comstock, J. H., 'A Note on the Habits of the Wall-bee, *Chalicodomv muraria*,' *Ann. of the Ent. Soc. of Amer.*, Vol. II., 1909, pp. 9–10.

[2] Newell, W., "Notes on the Habits of the Argentine or 'New Orleans' Ant, *Iridomyrmex humilis* Mayr," *Jour. of Econ. Ent.*, Vol. I., 1908, pp. 21–34.

[3] Newell, W., 'Two Interesting Inquilines Occurring in the Nests of the Argentine Ant,' *Jour. of Econ. Ent.*, Vol. I., 1908, pp. 262–265.

[4] Wheeler, W. M., 'Studies on Myrmecophiles,' *Jour. N. Y. Ent. Soc.*, Vol. XVI., 1908, pp. 68–78; 136–143; 202–213.

denly the ant stops licking, protrudes her tongue and regurgitates a drop of food on the face of the beetle. The beetle protrudes its head, opens its mouth, works its jaws and rapidly absorbs the liquid. This alternate licking and feeding behavior may be repeated over and over again. Even when the beetle is feeding on solid food, the ant will often tear it away and feed it in the manner just described.

V. Vestigial Instincts.

That certain animal instincts are purposeless relicts of past habits has been recognized by Darwin, Forel and others. Wheeler's recent comparative study [1] is a valuable contribution to our knowledge of such instincts. Lack of space restricts me to a mere statement of the author's conclusions. (1) "We not only find ants exhibiting vestigial instincts as a species, but a certain caste within the species may show vestiges of instincts whose full exercise is the prerogative of a different caste." (2) "The vestigial instinct action presents itself as a case of racial or phyletic recollection and must, like representations of individual memory, depend on psychological dispositions abiding in latency." (3) "Vestigial instincts obviously represent a part of an animal's endowment, and their manifestation shows that the capacities of even the lower organisms are greater than their ordinary routine behavior might lead us to suppose." The author stresses his belief in the comparative study of instincts.

VI. Recognition and Memory.

Recent researches have furnished additional evidence, if such be needed, that the homing of the hymenoptera is due neither to a homing instinct nor to any form of reflex action, but to memory. Buttel-Reepen [2] states that the homing of the bumble bee, like that of the honey bee, is largely the result of vision and memory. He believes, however, that odors are effective even at a distance. Giltay [3] also claims that the bee has spacial memory and that it returns frequently to a place that it has once visited, even if in the meanwhile one has cut off the flower. He thinks that, for bees, color has great attractive power and that the influence of odors and shapes is insignificant: even honey seems to have less attractive power than color. Turner has

[1] Wheeler, W. M., 'Vestigial Instincts in Insects and Other Animals,' *Amer. Jour. of Psy.*, Vol. XIX., 1908, pp. 1–13.

[2] Buttel-Reepen, 'Zur Psychobiologie der Hummeln,' *Biol. Centralbl.*, Bd. XXVII., S. 579–587; 604–613.

[3] Giltay, E., 'Ueber die Bedeutung der Krone bei den Blüten und über das Farbenunterscheidungsvermögen der Insekten,' *Jahrb. f. wiss. Botanik*, Bd. XLIII., 1907, S. 468–499.

shown that the mud-dauber wasps[1] and the burrowing bees[2] utilize landmarks in finding their way home. In the case of the mud-dauber light plays an important rôle, but it is light used as a landmark. Any pronounced change made in the topography of the vicinity of the nest of the burrowing bee is sure to disturb the insect on its return to the burrow. Under such conditions, the bee usually searches until it finds the burrow. Before departing again for the field, the bee makes a careful examination of the vicinity of the nest. This examination is never made unless some change has been made in the environment of the nest. If the proper alterations are made in the topography of the vicinity of the nest, the bee may be induced, temporarily, to enter a false burrow.

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RECENT LITERATURE ON THE BEHAVIOR OF BIRDS.

The research activity in the field of bird psychology has recently been so great that an extended review cannot be given in a small compass. The titles here cited serve as the basis of the brief outline which follows:

ABELSDORFF. 'Einige Bemerkung über den Farbensinn der Tag- und Nachtvogel.' *Archiv f. Augenheilkunde*, 58, S. 64.

CRAIG. 'The Expressions of Emotion in the Pigeon. I., The Blond Ring-Dove (*Turtur risorius*).' *Jour. Comp. Neur. and Psych.*, Vol. XIX., No. 1.

CRAIG. 'The Voices of Pigeons Regarded as a Means of Social Control.' *Amer. Jour. Soc.*, Vol. XIV., No. 1.

WATSON. 'The Behavior of Noddy and Sooty Terns.' Publ. 103 of the Carnegie Institution.

PORTER. 'Further Study of the English Sparrow and Other Birds.' *Amer. Jour. Psych.*, Vol. XVII.

KATZ UND RÉVÉSZ. 'Experimentell-Psychologische Untersuchungen mit Hühner.' *Zeit. f. Psych.*, 1909.

HESS. 'Ueber Dunkeladaptation bei Hühnern und Tauben.' *Archiv f. Augenheilkunde*, Bd. 57, S. 298.

HESS. 'Untersuchungen über Lichtsinn und Farbensinn der Tagvogel.' *Ibid.*, 57, S. 317.

HESS. 'Untersuchungen über die Ausdehnung des pupillo-motorisch wirksamen Bezirkes der Netzhaut und über die pupillo-motorischen Aufnahmeorgane.' *Ibid.*, 58, S. 182.

HESS. 'Untersuchungen über das Sehen und über die Pupillen-reaction von Tag- und von Nacht-vögeln.' *Ibid.*, 59, S. 143.

[1] Turner, C. H., 'The Homing of the Mud-Dauber,' *Biol. Bull.*, Vol. XV., 1908, pp. 215–225.

[2] Turner, C. H., 'The Homing of the Burrowing-Bees (Anthophoridæ),' *Biol. Bull.*, Vol. XV., 1908, pp. 247–258.

Craig gives an accurate and detailed account of the various vocal expressions of one species of pigeon. This furnishes part of the raw material to be used in a series of papers dealing with such topics as inheritance, selection, variation, social influence, etc. The paper on the latter topic has been published. The instincts are found to be flexible. The influence of voice on the social activities of nest-building, breeding, the care of the young, etc., is depicted.

Watson studied the noddy and sooty terns in their native habitat on Bird-key. Much of the work was preliminary in character and was concerned with observation of their habits and instincts. Their habits are discussed under the various cycles of activity such as mating, brooding and rearing the young. Visual and auditory data were both probably used in recognition of mates. In the reaction to the nest, visual factors are not exclusively used, a locality or position factor apparently being utilized when the customary visual clues were disturbed. These birds if sent *north* can return from a distance of one thousand miles along an unfamiliar coast although they have never been more than 15 knots distant from the island in that direction. Young birds learn Porter's simple maze but could not traverse it in complete darkness. They could traverse it however if it were faintly illuminated. Rotation of the maze disturbed the reaction.

Porter experimented upon sparrows, cow-birds and pigeons, using the maze and the food-box as problems. Tests on retention of their habits were made: Little was forgotten after 30 days, but there was quite a loss after an interval of one hundred and forty days. They distinguished marked cards and between variously colored cards.

Katz and Révész used, as a problem on the hen, the inhibition of a preference tendency for food. He found that an increasing interval between groups of tests from 15 seconds to one hour gave a corresponding increase of effectiveness. Retention was tested. Form discrimination was present. When conflicting tendencies occurred the older tendency became more effective as time elapsed. Vertical grains were discriminated from horizontal ones. In a row of grains, the bird learned to select every second or every third grain. Beyond this there was failure. No conclusions in favor of a number sense were advanced. Comparisons were made with the results on human memory.

Hess, Abelsdorff, and Katz and Révész experimented on vision. Hess's tests were the most extended. He used both spectral lights and transmitted lights. (1) The commonly accepted hypothesis that dark adaptation is a function of the visual purple is disproved. Adap-

tation is present in doves, the albino turtle dove and the domesticated fowl. Its scope and rapidity is like that in man. These birds possess few rods and only occasional traces of purple. This conclusion seems well established. (2) The blindness due to a sudden strong light is found to have no relation to the presence of visual purple. Hens are not blinded and possess no purple; owls can see by day, they are not blinded and they possess an abundance of purple. (3) Hess proved that such day-birds as the hen, forty-eight hour chicks, doves, turkey, finch, jack-daw, kestrel and hawk possess a shortened spectrum. Food illumined by rays from blue green to the violet was not touched. The spectrum is longer for owls. Dark adaptation increases the limit slightly towards the violet. A decrease of intensity shortens the spectrum still more. The limit of visibility upon the red end is identical to that for man. This shortening of the spectrum is correlated with the presence of colored oil globules on the cones. These are red and orange with day-birds and hence the short waves of light are absorbed. Owls possess yellow and weak yellow-green globules and as a consequence their spectrum is longer than that of the day-birds. The vision of birds is assumed to be similar to that of man wearing red and orange glasses. Such glasses increased the brightness of the red end relative to that of the blue-violet end. These globules are located between the internal and external processes of the cones and hence the external process is the receptive organ for vision and the pupillary reflex. (4) The amount of pupillary contraction for various wave-lengths was tested by Hess. For day-birds yellow gives the maximum of effect. From yellow to violet the effect decreases more rapidly than from yellow to red. The curve is similar for owls with the exception that the yellow-green gives the maximum of effect. The relative effect of the spectral series is thought to be similar to the brightness values of the spectrum as determined by Hering and to the relative effectiveness of the spectral lights upon food selection. These results were confirmed in a general way by Abelsdorff. (5) Hess, Katz, and Révész conclude that the Purkinje phenomenon holds for birds. With normal intensity of the spectrum, birds first chose the food in the yellow. With a colorless spectrum, they first selected that part brightest to the human eye. (6) Both papers conclude that birds possess color vision. Katz and Révész used variously colored grains of the same brightness to the human eye. Discrimination was possible. Such a conclusion is preposterous. Hess secured a selection of food in a spectral red in preference to that in the blue, when the red was much darker than the blue to man. Since the bird

reacted usually to the brighter color, he concludes that in this case they reacted to the red as red. This conclusion is utterly unfounded, for all his facts indicate that the waves from green to violet are intercepted by the oil globules. This end possesses but little stimulating value. The facts can better be interpreted on the assumption that the spectrum does not possess the same brightness value for birds as for man, that the green-violet lights are less bright than the yellow-red. All of the facts can be explained on the assumption of mere brightness discrimination. (7) Katz and Révész adapted birds to colored light and then compared their reaction with their normal reaction. A disturbance was evidenced, but there was no proof that negative after-images resulted from this adaptation. The influence of adaptation to color upon dark adaptation was studied. The darker the color, the quicker the adaptation, was the apparent result.

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RECENT INVESTIGATIONS BEARING UPON THE BEHAVIOR OF MAMMALS.

The various researches upon the visual and auditory reactions of the dog undertaken by Pawlow's method have already been discussed by Professor Yerkes and Doctor Morgulis. The lack of space prevents us from reviewing here, at any length, more than a few of the recent additions to our knowledge of mammalian behavior. The task of presenting in a single number of the BULLETIN anything like an adequate picture of the year's research in comparative psychology becomes more and more difficult.

HABIT FORMATION.

Yerkes and Dodson[2] have given a very careful quantitative study of the effect upon the rise of the white-black discrimination habit of using different intensities of the electric shock (the punishment for entering the darker of the two boxes). Dancing mice were the animals used. It was found in general that the relation of the strength of the electrical stimulus to the rapidity of the learning depended upon the difficultness of the habit. When the two boxes differed greatly in brightness, the rapidity of learning increased as the strength of the stimulus increased from the point of the threshold of stimulation to the point of harmful intensity. When the boxes differed only slightly in brightness the

[1] With the assistance of Misses Fernald and Weidensall, Dr. Waugh and Messrs. Adams and Sutherland.

[2] "The Relation of Strength of Stimulus to Rapidity of Habit Formation," *Jr. Comp. Neurol. and Psy.*, Vol. XVIII., 1908.

rapidity of learning at first rapidly increased as the stimulus increased, but beyond a certain intensity, which was soon reached, it began to decrease. As the difficultness of the discrimination was still further increased the strength of that stimulus which is most favorable to habit formation approached the threshold.

Audition.

O. Kalischer[1] has materially advanced our knowledge of the auditory sensitivity of the dog. His work is qualitative in character but it paves the way for a more careful quantitive study. He first tested the dogs with an organ containing nine pipes differing from one another in pitch by almost an octave (deren Töne voneinander fast alle um je eine Octave differierten). The dogs were first taught to respond to the food tone by snapping at a piece of meat held in the hand of the experimenter, and to inhibit this reaction when any other tone was sounded. In later experiments the dogs were forced to spring with the fore feet to the top of a chair before the food could be reached. The experimenter covered the meat with the hand if the dog attempted to get the food whenever the Gegentöne were sounded. The dogs quickly learned to discriminate between the Fresston and the Gegentöne. Many dogs after four or five periods of experimentation (total number of trials not given) began to inhibit reaction to tones other than the food tone. It was found that a habit so formed could readily be broken and the animal trained to react to some other food tone. The animals were trained to react to food tones as low as c_{7} and as high as c^{1}. (No statement other than this is given of the dog's range of pitch.) The harmonium, on account of the sustained character of its tones and its small intervals, is well suited to this type of test. On this instrument the discrimination was perfected to the point where the interval was not greater than a half tone. (No more exact statement than this of the qualitative D. L. is given.) A well trained dog can easily discriminate between clangs which contain the Fresston and those which do not. A habit of discrimination once established is held for long periods of time without further exercise in the habit. The work was controlled by destruction of one or both cochlea, production of temporary blindness, etc. The above reactions were proven to be in all probability auditory in character. Some further work in the paper is concerned with the central apparatus in hearing. The light he throws upon the problem is certainly a faint one.

[1] 'Eine neue Hörprüfungsmethode bei Hunden,' *Sitz. d. Kgl. Ak. d. Wiss.*, X., 1907, p. 204 ff.

Tests in our own laboratory made by Dr. Asa Shaefer upon dogs blind from birth, show that Kalischer's contention for phenomenal pitch sensitivity in dogs is well founded. The paper makes somewhat unpleasant reading because of the fact that Kalischer for some reason or other is laboring under the delusion that he is the originator of the Dressurmethode. That it has been in common use in this country since Thorndike's earliest experiments seems to have escaped his notice.

Vision.

Watson's[1] experiments upon the color vision of monkeys is merely preliminary. That the habit of discriminating between the red and green and between the yellow and blue lights (spectral) arose rapidly and was persisted in steadily all through the great changes which were introduced in the brightness cannot be contested. The author is not ready to affirm without further experimentation that the discrimination was made on the basis of hue and not that of intensity.

Samoljoff and Pheophilaktowa[2] present an interesting series of experiments upon the color vision of the dog. The method consisted essentially in training the dog to select a box with a colored circle pasted on top (green No. i of the Zimmermann series) from two other similar boxes having gray discs of the same size on top (grays selected from Nendel's series). The dogs experienced great difficulty whenever the grays were chosen from any of the numbers from 9–16. After much practice the dogs overcame their difficulties and could make the proper selection with a high degree of accuracy. The habit broke down, however, when the color stimulus took the form of circles, triangles and squares, while the grays were left as in the original test (as circles 25 cm. in diameter). The authors are very conservative in their conclusions. We await with a good deal of interest the further results of their work.

Nagel[3] has a short paper in the same volume of the above journal. It merely calls the attention of the above authors to a similar work of his own and Himstedt's, made some years ago, which apparently had been forgotten by the authors just reviewed (deservedly so!). The experiments referred to by Nagel were those made upon a poodle which had been trained to select at command a red ball from a large number of blue balls differing in brightness. In this last communication,

[1] 'Some Experiments Bearing upon the Color Vision of Monkeys,' *Jr. Comp. Neurol. and Psy.*, Vol. XIX., No. 1, April, 1909.

[2] 'Ueber die Farbenwahrnehmung beim Hunde,' *Zentral. f. Physiologie*, 1907, p. 133 ff.

[3] 'Der Farbensinn des Hundes,' *Zentral. f. Physiologie*, 1907, p. 205.

Nagel states that the dog had been still further trained by Himstedt to seek out red, blue or gray at command from a large series of differently colored balls.

None of these tests can escape the commoner criticisms which have been so often urged against such types of experiments.

Books and General Discussions.

The field has been enriched by the appearance of several books and general papers which can be mentioned only by title. Among these we note the following:

Zur Strassen, Otto. *Die neuere Tierpsychologie.* Leipzig u. Berlin, 1908.

Sokolowsky, A. *Beobachtungen über die Psyche der Menschenaffen.* Frankfurt am Main, 1908.

Bohn, Georges. *La Naissance de l'Intelligence.* Paris, 1909.

Edinger, L., und Claparède, Ed. *Ueber Tierpsychologie.* Leipsig, 1909.

Kirkpatrick, E. A. *Genetic Psychology.* Macmillan Co., 1909.

Schäffer, C. *Ueber die Seelenfrage.* Verhand. d. Naturw. Vereins zu Hamburg, 1908, 3. Folge XVI.

J. B. W.

BOOKS RECEIVED FROM JULY 5 TO AUGUST 5.

Archives of Psychology. Ed. by R. S. Woodworth. No. 13. *The Inaccuracy of Movement, with Special Reference to Constant Errors.* H. L. Hollingworth. Pp. 87. No. 14. *A Quantitative Study of Rhythm: The Effect of Variations in Intensity, Rate and Duration.* H. H. Woodrow. Pp. 66. New York, Science Press, 1909.

Bulletin No. 1, Government Hospital for the Insane. Ed. by William A. White. Washington, Gov. Printing Office, 1909. Pp. 106.

NOTES AND NEWS.

The present number of the Bulletin, dealing especially with Comparative Psychology, has been prepared under the editorial care of Professor Watson.

Manuscripts intended for publication in the series of *Psychological Monographs* of this Review should be addressed to Professor James R. Angell, University of Chicago, who takes the place of Professor Judd as editor of the series.

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THE

PSYCHOLOGICAL BULLETIN

A CONTRIBUTION TO THE THEORY OF TONAL CONSONANCE.[1]

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On approaching the problem of tonal consonance one meets with three theories of explanation which are, in a way, classic:

First, the theory of Helmholtz which explains consonance by the identity of overtones among the two or more clangs, and dissonance by the presence of beats among the overtones.

Second, the theory of Lipps which is based upon the unconscious rhythms existing among the vibrations of the fundamentals, which as they coincide produce the effect of consonance, and as they fail to coincide, the effect of dissonance.

Third, the theory of Stumpf which centers about the principle of *fusion;* really, this is but an attempt to describe exactly the data of consonance, together with a reference, for complete explanation, to an unknown but fundamental physiological effect.

These theories are all sufficiently well known, and have been subjected to searching criticism with sufficient frequency to justify me in neglecting any very close inspection of them at this time. What I have to contribute to the theory of consonance is not a new conception, which in its acceptance must invalidate all other theories, but consists, rather, in some supplementary ideas on the subject which, so far as I have been able to discover from the somewhat meager literature at my disposal, have been either overlooked or too hurriedly discredited. I shall, therefore, attempt to show that in explaining the phenomena of consonance these considerations are of equal importance with, if

[1] Read before the Southern Society of Philosophy and Psychology, Baltimore meeting, December, 1908.

not of greater importance than, any others which have thus far been brought forward.

The theory around which my ideas center is one which has been placed in disrepute to a large degree by the critique which Stumpf has accorded it. In the *Tonpsychologie* (II., p. 208 f.) while discussing the various possible causes for tonal fusion, Stumpf raises the question: Is frequent combination the cause of fusion? He then proceeds to describe this theory as follows:

"Wenn neuere Psychologen Recht haben, tritt durch die blosse Häufigkeit des Zusammenseins zweier beliebiger Vorstellungen im individuellen Bewusstsein allmählig auch ohne jedes Aehnlichkeitsverhältnis zwischen ihnen eine Art Verschmelzung ein. Es entsteht eine 'untrennbare Association' und zugleich wandeln sich die so verwachsenden Vorstellungen in eine qualitativ neue einheitliche Vorstellung um (Chemie der Vorstellungen). . . .

"Und die Voraussetzung träfe ja zu. Wenn wir die harmonischen Obertöne eines Klanges beispielsweise bis zum 16. Teilton (der vierten Octave des Grundtons) vorhanden denken, so findet sich das Verhältnis der Octave unter diesen 16 Tönen 9 mal (1:2, 2:4, 3:6, 4:8 u.s.f.), das der Quinte 5 mal, das der Quarte 4 mal, das der grossen Terz und Sext 3 mal, das der kleinen Terz und Sext sowie der natürlichen Septime 2 mal (bei Berücksichtigung der Teiltöne bis zum 18. auch diese 3 mal), das der grossen und kleinen Secunde 1 mal. Ausserdem wirkt im gleichen Sinne der Umstand, dass, wenn wir zunächst die Reihe lückenlos und die Klänge nur durch die Zahl der vorhandenen Obertöne verschieden denken, die höheren Obertöne nicht ohne die niederen, diese aber ohne jede vorkommen, und dass vom ersten zum zweiten Teilton eine Octave, vom zweiten zum dritten eine Quinte, dann eine Quarte, dann Terzen stattfinden; woraus folgt, dass auch in den verschiedenen Klängen das Octavenverhältnis am häufigsten vertreten ist und dann in abnehmender Anzahl die übrigen genannten Intervalle."

Stumpf then proceeds to declare the principle *illusory*, mainly on two counts:

First, that there are no 'inseparable associations.' Experience teaches that any association can be broken up and replaced by another involving part of the former, provided only the new association be more frequently made than the old. This would be the case, for instance, when a student of music practices various kinds of intervals. As a result of this view one might expect the interval of the second by reason of its frequency in melody to form as fixed an associational fusion as would the octave because of its frequency in harmony.

Second, that there is no 'chemistry of ideas.' Being together in consciousness innumerable times does not necessarily involve fusion: were this the case the frequent tritonal chord would tend more and more to become a unit, and one might expect that a person who heard music frequently should be less capable of differentiating an octave and a fifth than one who heard music seldom.

These criticisms, though based upon the peculiarly unique character which Stumpf attributes to *fusion*, and not upon the somewhat simpler conception which I would apply to *consonance*,[1] are nevertheless well-nigh irrefutable so long as we regard the phenomena of consonance to be the result of an individual's personal experience with tonal combinations. But the whole matter takes on quite a different aspect when we envisage it from the point of view of racial experience. If we must admit that 'inseparable associations' resulting in a 'chemical' union of their constituent factors to produce a unique and unified experience, such as Stumpf regards tonal fusion to be, is *not* a common result of individual experience, we have, on the other hand, every reason for supposing that congenital associations result from racial experience of a definite and oft-recurring sort, to produce instinctive modes of adjustment and attendant complexes of experience which are fundamentally unified. Of course, such experiences are not necessarily beyond the power of a mature intellect's capacity of analysis, and I do not consider it a datum of consonance that it should or does defy such analysis.

The simple fact is that when tones are experienced they are usually accompanied by overtones. Without the capacity for analyzing these, they are still present and cause the organism to function in certain definite ways. The most intensive of the overtones are, as a rule, those which are most frequently present. They are, at the same time, those which represent the most consonant relationships: the octave, the fifth, the fourth, the major and minor third.

This view of the matter causes Stumpf's 'inseparable associations' and 'chemistry of ideas' to appear as 'straw men.' But it is fair to state that Stumpf himself, as he seeks the cause of fusion in physiological activity, rehabilitates this theory to the extent of granting that an indirect cause of fusion may be attributed to the *disposition* which the

[1] There is some confusion among various authors as to the differentiation of these two terms. Stumpf tends to identify them, whereas Jodl, for instance, regards fusion as a phenomenon of sensation, consonance and dissonance as phenomena of feeling and as esthetic elements (*Lehrbuch der Psych.*, 2d ed., I., p. 362); Wundt entertains similar ideas (*Grundzüge*, 5th ed., II., pp. 111 f., 421 f.).

organism would acquire through the frequent experience of overtone intervals to respond to these as more or less unified wholes. But this disposition, it seems to me, need by no means be considered so indirect and variable as Stumpf would have it, especially when one considers it as a congenital acquisition.

The nervous correlate of a consonant relationship I regard as nothing other than a relatively simple and economic activity on the part of the sense organ and nervous system. Such dispositions, I take it, are in the nature of fundamental capacities resulting from very frequent racial experiences. Thus considered, the experience of consonance may be said to possess a uniqueness having much the same sort of quality as attaches to recognition; though recognition, of course, being based upon individual experience, is more variable.

Simple tones, though they vary in absolute vibration rate, appear again and again involving the same relationships of accompanying overtones, and therefore stimulating the nerve ends in the same functional patterns. On the other hand, more complex and irregular vibrations present ever-changing stimulations which, in the case of noises, vary to such an extent that it is with difficulty that we can memorize or reproduce the simplest of them. Dissonant relationships, when comparatively simple, though they do not have the congenital quality of easy functioning which characterizes the consonant relations, are nevertheless rather easily familiarized. In this fact we may, perhaps, find an explanation for what appears to be a gradual increase in the number of tonal relations which music makes use of. [1]

As a result of racial experience, then, it seems to me that we are justified in assuming that a greater ease of functioning will naturally evolve respecting tones, which, when present in consciousness simultaneously or successively, represent relationships that the experience of overtones has made familiar. Since these relationships must exist from the very beginning of man's ability to hear tones, a congenital association may be said to form resulting in a physiological adaptation which becomes as inherent in the organism as those which account for the apprehension of rhythm, symmetry, proportion or the fusion of

[1] Müller-Freienfels, for instance, in a recent article ('Zur Theorie der ästhetischen Elementarerscheinungen,' *Vierteljahrschrift f. wiss. Phil.*, XXXII. Jahrg., H. II., p. 204 f.) notes that the octave was regarded the most beautiful consonance by the Greeks. In the Middle Ages the fifth became most conspicuous, and only gradually was the third admitted to the rank of a consonant relation. Mozart, Beethoven and Rossini were all in their times criticized for the admission of dissonances, and to-day the music of Strauss is a bone of contention for this same reason.

taste and smell. It is not necessary to assume the inheritance of acquired characteristics to explain this disposition of the organism, because the fundamental consonant relations are present whenever overtones are stimulated.

As stated at the beginning, I do not propose to deny whatever significance may properly be construed to attach to the Helmholtzian, Lippsian or Stumpfian interpretations. There is also much to say in favor of the importance of difference tones in this connection, as has been more recently developed by Wundt[1] and Krüger.[2] Within the respective limitations which recognized criticism has set for them, each of these may be regarded as furnishing contributory factors of explanation. Nevertheless it should be noted that each of these theories attempts to explain the phenomena by the analysis of two or more related tones *when simultaneously experienced.* On the other hand, the theory which I support must, I think, be regarded as more fundamental than these, since it lays stress upon a physiological disposition which is acquired whenever tones are experienced, either singly or together, and refers primarily to frequency and simplicity of function rather than to the conscious or unconscious apprehension of coincident overtones, difference tones or rhythms.

In addition to these theories, however, I also recognize the immense influence on the development of consonant relations, which practical and technical exigencies, such as the character of the human voice and the musical instruments of man, have exerted. These influences I, of course, do not regard as congenital, but rather as affording an explanation for the cultivation of man's taste and interest in harmony and melody.

Turning now, briefly, to the affective and esthetic features of consonance, I am not inclined to grant to these simple relationships a necessary esthetic effectiveness, neither do I regard them properly described as elementary feelings of pleasantness. The relative simplicity and economy of their functioning lends a unique quality to the experience, but to give pleasure would require, in accordance with Professor Meyer's recently formulated theory,[3] which, in the main, I accept, that the experience be enriched by the presence of contributory conscious factors. As to the esthetic character of the experience, this would obtain, according to my belief, only in case this function proved to be the central

[1] *Grundzüge,* 5th ed., II, p. 421 f.

[2] 'Differentztöne u. Konsonanz,' *Archiv f. d. ges. Psych.*, I., Hefte 2–3; II., Heft 1.

[3] 'The Nervous Correlate of Pleasantness and Unpleasantness,' PSYCH. REV., XV., 4, 5.

point in an all-pervading and relatively complete adjustment. This relatively complete adjustment finds its main characteristic in the absence of dominant volitional tendencies. It is, however, not to be considered as a *static* condition. On the contrary, it may very well denote a succession of mental states each one of which evolves from the preceding without any conspicuous demand for active volitional direction. What is often described as 'non-voluntary' or 'spontaneous' attention might be called an esthetic state were it not for the manifest absence of control. Active control is called for in the esthetic state in the sense that a certain 'set' or adaptation of the organism is requisite. But the state is nevertheless differentiated from the active *practical* consciousness of voluntary control by the relative ease and lack of effort which characterizes it. The esthetic adjustments appear as though ready-made for the percipient. He simply finds himself *en rapport* with them while all his faculties are alive to tracing out the conformable pattern which the esthetic object presents. This is the reason why the esthetic state is almost always the result of an objective stimulus, almost never composed of purely ideational factors: in the latter case the control is too indefinite.

A simple interval such as the octave is consonant by the very nature of its being. It becomes pleasant when accompanied by other subordinate experiences which contribute to it and enrich it. It is esthetic when it forces its way into the focus of attention and denotes the principal factor in a total process which signifies an immediate and relatively complete adjustment.

A consonant relationship, then, is neither necessarily pleasant nor esthetic. It may be both or neither; it may be pleasant and unesthetic, or esthetic and unpleasant. This view results from regarding consonance as the mere consciousness of a relatively simple functional disposition resulting from a fundamental characteristic of tonal stimuli. As such it may be experienced within or without the focus of attention. If it becomes pleasantly or unpleasantly toned, this is because it has become enriched or depleted through coalition with other conscious factors which either augment or interfere with its function. Here again it may be either a subsidiary or a dominant experience. The condition for its esthetic effect is that it shall become a central feature in consciousness, and as such form the dominant element in a pattern of experience which pervades consciousness as a whole and is characterized by the absence of conspicuous motives for readjustment.

The esthetic experience is enriched in the usual way when the contributory factors present tend actively to augment the central factor.

Otherwise, a state of equilibrium may obtain between the various factors resulting in an esthetic state which is affectionally neutral. Or we may even assume the possibility of an esthetic state being unpleasant when the contributory factors tend to check and deplete the central process. In case either the augmentation or depletion of the process becomes considerable — and more readily, no doubt, with depletion — the esthetic character of the situation tends to be destroyed because an emotional discharge is apt to set in. All states where an emotion is dominant are unesthetic in nature because of the fact that motives for readjustment are conspicuous. On the other hand, subordinate emotional activities may enhance the esthetic effect, and be made manifest only as a high degree of pleasure. Also, up to a certain degree, unpleasantness, due to an emotional tendency to deplete or check the dominant experience, may merely lend a heightened interest to the situation without disrupting its esthetic character — as, for instance, in the esthetic contemplation of the tragic, the melancholic, the weird and the gruesome.

PSYCHOLOGICAL LITERATURE.

TEMPERATURE SENSES.

Untersuchungen über die Temperatursinne. SYDNEY ALRUTZ. Zeitschrift für Psychol., XLVII., 161–202, 241–286; XLVIII., 385–396.

This investigation was undertaken in the hope of throwing more light upon the following questions: (1) Can it be determined that a heat sensation and a 'paradoxical cold' sensation, *i. e.*, a sensation produced in a cold end-organ by warm stimuli, have the same perception interval, while that of a warmth sensation is shorter? (2) At what temperature or strength of stimulus is a heat sensation first perceived on different parts of the skin? (3) Can a heat sensation be analyzed? (4) What tone has a heat sensation in general? (5) What relation does this tone bear to the cold and warmth sensations?

From the experiments which he performed, the author found that heat sensations result from a simultaneous stimulation of the cold and warmth nerves, because the perception interval of both the heat and 'paradoxical cold' sensations is twice as great as that of the warm, and lower values are obtained for the reaction time for high temperature stimuli. For these reasons he concluded that the cold nerves must have been stimulated. The reaction time of a heat sensation varies with the temperature of the stimulus and the locality of the skin affected, which is explained by the varying thickness of the skin, the difference in number of nerve cells and the susceptibility of the cold nerves to be affected by warm stimuli, since different parts of the body are accustomed to different temperatures.

From experiments on the lips and mouth, he found that pure warmth sensations, and weak ones at that, can be obtained only on two locations, (1) on the lips and (2) in the mouth, just inside the lips. On the other parts of the mouth and cheeks, it was difficult to determine whether a warmth sensation was present, before the stimulus was sufficiently increased for a heat sensation to be perceived. For different parts of the lips and the interior of the mouth, the increase of stimulus necessary to produce a heat sensation varies, and is lowest for the lower lip. On the whole, the author agrees with other writers in the view that in the interior of the mouth the warmth sense is poorly developed while the cold sense is well developed.

By varying the temperature of the skin stimulated, it was found that with a sudden lowering of the temperature of the skin, the absolute increase of stimulus necessary to produce a heat sensation is lowered, whereas the relative rise of stimulus increases considerably. With a sudden raising of the temperature, the opposite effect is obtained. In this connection, it was also observed that the ability of the cold end-organs to perceive heat sensations increases in proportion to their own rise in temperature.

Furthermore, Alrutz concludes that heat sensation cannot be analyzed, but bears the same relation to warmth and cold sensations that the color orange bears to red and yellow, *i. e.*, a heat sensation is a fusion of both warmth and cold with the cold element affecting the intensity more than the warmth. The author varied the temperature of the stimulus on a certain spot and found that heat sensations of different intensities were obtained, the weak ones having an indifferent tone, but those of greater intensity a strong and uncomfortable tone.

In order to determine the effect of these principles on bathing, some experiments were made in warm baths. In general, the results obtained were the same as above: (1) The higher the skin temperature, the higher lies the absolute increase of stimulus necessary to produce a heat sensation, and conversely. (2) The higher the skin temperature, the lower the value of the relative increase of stimulus, and conversely. (3) The heat sensations, which are produced at a temperature of 35° C. or lower, are more or less temporary and are replaced by warmth sensations, which also shortly disappear. (4) The final conclusion is that baths in water whose temperature exceeds 36° can be regarded, according to the effect produced by them on the skin, as a combination of warm and cold baths.

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VISION.

The Intermittence of Minimal Visual Sensations. I. The Fluctuation of the Negative After-Image. C. E. Ferree. Amer. Journal of Psychol., 1908, XIX., 58–129.

In a previous paper (*Am. Jour. of Psy.*, Jan., 1906) the author tried to show (1) that the intermittence of minimal visual stimuli is a phenomenon of adaptation; (2) that the intermittence is caused by involuntary eye movement; (3) that eye movement enables restoration to take place (*a*) by reducing the time of stimulation and (*b*) by shifting the area that is stimulated.

The object of the present paper is to show how eye movement can cause fluctuation of the negative after-image, and to point out the inadequacy of other theories. In succeeding papers the author will show the relation of the negative after-image to the intermittence of minimal visual stimuli and to adaptation.

The oscillatory theory represented by Plateau, Hering, and G. E. Müller disregards eye movement altogether; while the fatigue theory, represented by Fechner, Helmholtz, and Fick and Gürber, attributes direct influence to eye movement, but the causes are either unexplained or are untenable.

Hering's four arguments, based upon experiments, against eye movement Ferree shows to be untenable. Repeating the experiments under varying conditions he finds that eye movements *do* occur where Hering failed to find them, and that where Hering found no disappearance resulting from eye movement the image was at least *dimmed*, and disappeared when the intensity of the stimulus was lessened.

Exner agrees with Hering that eye movement does not cause the after-images to disappear by affecting the visual processes. Eye movement causes distraction of perception of the after-image, and hence the disappearance. Ferree finds, however, (1) that disappearance takes place only when the eye movement is rapid, and (2) that the after-image has permanently disappeared when the eye movement is stopped. Exner cannot explain why the after-image does not become visible again after the distraction has ceased. According to Exner, the more uniform the background the more distraction, and consequently the less fluctuation. But Ferree found the results the same experimentally whether a uniform or a mottled background was used.

The author then shows by experiments the causal connection between eye movement and fluctuation. In all cases where there was increased fluctuation there was increased eye movement. In particular: (1) Fluctuation does not occur when the after-image is too large or too small. Only with mean areas was there a tendency to move the eyes. (2) The steadier the fixation the less fluctuation, and conversely. (3) There were more fluctuations with a narrow strip as stimulus than with a square. (4) There were more fluctuations when the strip was turned vertically than horizontally. (5) The same results as in (1), (3) and (4) were obtained when voluntary eye movement was tried. (6) The longer the stimulus was fixated, the greater the number of fluctuations. (7) The more sensitive the individual to disturbances when fixating, the greater the fluctuations. (8) The more practiced the individual, the less fluctuation.

The author next shows the inadequacy of the fatigue theory. Helmholtz's view, that eye movement causes fluctuation by changing the illumination, does not account for the effects of varying the area of the after-image, nor for fluctuation in parts. Fechner's view, that eye movement causes vascular and nervous changes, does not explain the effects of variation in area, fluctuation in parts, nor the effects produced by varying the form and arrangement of stimulus.

Ferree explains the fluctuation and disappearance of after-image by what he calls 'streaming.' If in a bright diffuse light one close the eyes, not tightly, but so as to admit no light, and look deep into the field of vision, something like granules may be seen to flow across. There is apparently no order to the movement till the eyes are moved, when the direction of the streaming changes to that of the eye movement. The currents move with varying speed and in different directions. The streaming is narrower and heavier in the center of the field than elsewhere. The author thinks streaming is due to granules which flow over the retina. It is not due to entropy, circulation or a tear film, for (1) it is seen in the dark as well as in the light; (2) the streams have the same color as the background; (3) if the stream is weak the after-image is dimmed, if it is strong the after-image disappears.

The relation of streaming to fluctuation is as follows: (1) Only after-images of mean size fluctuate. This is because the streaming completely obscures a very small after-image and does not sufficiently obscure it when it is very large. (2) Greater fluctuation takes place when the stimulus is a narrow strip than when a square of the same area. The after-image due to the square obscures the whole area of streaming, while that resulting from the narrow strip does not. (3) There is more fluctuation when the strip is turned vertically than when placed horizontally. The heaviest streaming is in a horizontal direction (the direction of greatest eye movement); consequently, the vertical strip is more easily obscured. (4) Streaming explains how the results produced by involuntary eye movement can be duplicated by those obtained by voluntary. (5) When an after-image passes from one part of the field to another the increase and decrease of its fluctuation is what should be expected from its position with respect to the streams.

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A Preliminary Study of Experiments on Time Relations in Binocular Vision. TIMOTHY J. STEVENSON and E. C. SANFORD. Amer. J. of Psychol., 1908, XIX., 130–137.

The study, of which this paper is a preliminary report, belongs in the same general group with studies previously made by Münsterberg, by Dvorák, and by Exner on the gaining of stereoscopic effect by presenting the two halves of the stereogram separately, each to its particular eye.

The present problem is concerned with the time interval which may come between the presentation of the two pictures without destroying the stereoscopic relief; and, in addition, the preliminary results given in this paper show the effect of the insertion of too great an interval between the presentations.

The apparatus is an adaptation of the Wheatstone stereoscope. The diagrams were exhibited through notches in two revolving cardboard discs, which could be set in such a way as to expose the two pictures successively, each for a brief period, with any desired time interval between the exposures. Three kinds of discs were used, black, white, and medium gray, because of the effect of the brightness of the background upon the duration of after-images.

It was determined that if to the actual duration of the exposure of the first picture be added the duration of the after-image, practically no interval whatever can be inserted between the periods of excitation of the two retinas without destruction of the stereoscopic relief.

Upon two points in regard to the effect of the time interval the results were uniform. First, when the interval is too long to allow stereoscopic relief, the parts of the diagram seem to be in motion, changing rapidly from the position they occupy in one picture to that which they hold in the other. Double images are not seen. And, second, as the interval is shortened so that conditions are favorable for the proper relief, the relief does not flash out suddenly in its full amount, but grows gradually with each decrease in the interval, reaching its maximum with simultaneous exposure.

The writers suggest that the latter results furnish an argument in support of Wundt's theory of complex local signs in binocular vision. If the phenomenon can be looked upon as a reflex one, the tendency to movement ought to be roughly proportional to the time during which a very brief stimulus was operative binocularly, and these experiments show this to be the case.

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Ueber das Verhältnis der ebenmerklichen zu den übermerklichen Unterschieden auf dem Gebiet der optischen Raumwahrnehmung. J. LAUB. Archiv f. d. gesamte Psychol., 1908, XII., 312-339.

Under the direction of Külpe and in continuation of work done by Ament, Fröbes, and Lehmann upon Fechner's claim that the just observable difference is a constant and may therefore serve as a unit of measure, Laub undertook a series of experiments in the field of space perception. He chose this field because (1) the absolute impression would play no part when the stimuli were kept within narrow limits, and (2) the time and space errors could be ruled out.

Method of Procedure. — Forty brass squares, measuring 47 mm. on a side, were procured. From the center of each was cut a disc so that a series was formed in which the area of each successive disc was $\frac{1}{100}$ smaller than that of the preceding one. The largest disc was 19.5 mm., the smallest 14.8 mm. The first part of the observer's task was to construct a series in which each disc was just noticeably different from its immediate neighbor; the second part was to find the disc R_m which represented the subjective middle between the two extreme discs of the constructed row. If liminal differences are equal, R_m should coincide with the geometrical middle M of this row.

Eight observers were used in eight ascending and descending series. The space error was eliminated by changing the relative positions of the disc.

Results. — If Z represents the number of stimuli in the series increasing by liminal steps, M the geometric middle, and R_m the subjective middle between its extremities, it was found that:

1. Z, M, and R_m are independent of ascending and descending series, *i. e.*, the time error does not influence the results.

2. Z is not the same for all observers.

3. The fact that M varies for the same observer as much as it does for different observers shows that individuality is no factor.

4. R_m is widely different from M. In all cases it is nearer the larger extremity.

From these facts the author concludes that liminal differences increase in size with the absolute value of the stimulus.

Laub shows further, first by introspective analysis and then by experiments requiring a common method of judgment, that the method of making the judgment plays no part in the results obtained.

Laub's results tally with those of Ament and of Wrinch, who worked with time perception, in showing that the Fechner unit of measure has no general validity. M. GERTRUDE RAND.

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Contribution à la physiologie de la tache aveugle de Mariotte. O. Polimanti. Journal de Psychol. normale et pathol., 1908, IV., 289–302.

This discussion of the blind spot is introduced by a somewhat detailed summary of the results of experiments on the subject, particularly those of Johansson, J. Müller, Aubert, and Ovio, who showed that the area surrounding the entrance of the optic nerve is of relative, not of absolute blindness, as had previously been stated. Ovio, moreover, claims on experimental grounds that the retina in this region reacts to color as it does on the periphery of the eye.

In the second part of the paper, the author reports his experiments. Their object was to note (1) what changes each color underwent before its disappearance into the blind spot; (2) the distance from the observer at which the disappearance took place. For this purpose, a large background and small discs, 31 mm. in diameter, were prepared in colors of black, white, violet, indigo, blue, green, yellow, orange, and red. A background with a disc of a different color, 105 mm. from the fixation point, was placed in a fixture which could be moved backward and forward along a measuring rod, until the disc entered the blind spot and was no longer seen. The author was the only observer. He took pains to employ each eye successively and to avoid fatigue. His results show that:

1. All the colors lose in saturation as they enter the blind spot, passing through ash to gray before being lost in the background.

2. Orange disappears 4.3 mm. farther away from the eye than any other color; and black, the last to disappear, vanishes at a distance of 6.2 mm. nearer the eye than the disappearing point of orange. The figures in each case are the average of ten series of each color on each background.

In concluding, the author touches upon theories that attempt to explain the phenomena observed. Polimanti attributes the alteration of color to the physiological fact that the retinal layers decrease in number as they enter the blind spot, and the complete disappearance of colored discs into the color of the background to the psychological factor that the background predominates over the small gap left by the blind spot, leaving the gap unnoticeable.

M. Gertrude Rand.

PRACTICE.

The Effect of Practice in the Case of a Purely Intellectual Function. E. L. THORNDIKE. Amer. J. of Psychol., 1908, XIX., 374–384.

The author reports experiments in the mental multiplication of one three-place number by another for the purpose of showing the amount of improvement, its rate, progressive change of rate, and spread.

The experiment included thirty-three individuals. The time was noted, and an example was taken up and the two numbers looked at long enough to memorize them. Then, without sight of figures or other sensory aid, the multiplication was performed mentally, and at the end the time was again noted. The subjects were allowed to compare their results with the correct answer. A single measure of efficiency was obtained by transmuting errors into time by adding to the time taken per example one tenth of itself for each error made.

The improvement shown was large. The ratio of the scores for examples 90 to 95 to the scores for examples 1 to 5, equated so as to show both speed and accuracy, varied from .14 to .70, the median being .42 with .10 as median deviation. (These ratios are given, p. 377, ll. 8–10, as whole numbers instead of hundredths, as was undoubtedly intended.)

The fact of so large an improvement in so short a time by mature and competent minds is taken by the author to show (1) that "the training which the group had had for twenty-odd years in remembering facts, resisting distractions and carrying in the mind a series of complex relationships, had left this special function of mentally multiplying a three-place number by a three-place number in a very easily improvable condition;" (2) that the components of that previous training did not exert even a very moderate influence over the particular function trained; and (3) "that this improvement of over 50 per cent. must have been closely restricted to the special function involved," for one would scarcely claim that such practice would improve all of one's mental functions by 50 per cent., or 5 per cent., or even 1 per cent.

To the reviewer, the facts seem hardly to warrant these conclusions nor the implication that we have here evidence against the so-called doctrine of formal discipline. Might not the fact that twenty-odd years of training in remembering, concentrating, attending, etc., leave some special function in a 'very easily improvable condition' be looked upon as the result of such training, enabling the mind so trained

to transfer quickly such abilities to the particular function in question? And might not such a result be looked on as a highly desirable effect of general education? As a matter of fact, this is one of the claims made for the older disciplinary training by its advocates. Such training, they say, enables the mind much more quickly and easily to take up and perfect new though not wholly unrelated functions. The real question is: Did twenty-odd years' training or did inborn nature enable these individuals to make such great improvement?

A very great range in the amount of improvement was shown among twenty-eight individuals, some showing two and one half times as great improvement as others. There was positive correlation between the amount of improvement and general intellectual achievement in the twenty-eight individuals, being roughly estimated at .4. There was apparently a zero or a slight negative correlation between improvement and strength of visual imagery.

There was considerable variation in the rate of improvement, but in general, the earlier periods of practice show the greatest gross reduction in the scores. The author attempts to derive a general law of change of rate of improvement without trying to eliminate deviations due to external and internal disturbing factors.

This is done by eliminating the total amount of change from consideration in every case by taking the differences — score for examples 1 to 10 minus score for examples 11 to 20, and so on, and dividing these by the total change, *i. e.*, score for 1 to 10 minus score for 81 to 90. The curves thus obtained for 28 subjects and combined into one curve give the one rate of change from which the individual rates of change could come with the least improbability as the result of disturbing causes. From the curve thus obtained I have calculated by a rough measurement of the coördinates of the curves that 25 per cent. of the improvement resulted from the first 17.6 per cent. of the practice, 50 per cent. of the improvement from the first 33.1 per cent. of the practice, and 75 per cent. of the improvement from the first 62 per cent. of the practice, leaving the last 25 per cent. of the improvement as the result of the last 38 per cent. of the practice. The author, however, disclaims any attempt to decide whether there is any one general law of the rate of improvement.

In studying the different influence of equal practice upon individuals it was found that high mental ability tended to go with high rate of improvement, thus showing that equal practice tended to increase rather than diminish individual differences. The author concludes with the opinion that students with greater original capacity gain as much or

more from the same training. The conclusion seems to be, the better the student, the more he is able to profit by training, and, conversely, the greater the training, the greater the differences between those of higher and lower ability.

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Normal Performance in the Tapping Test. F. L. WELLS. Amer. J. of Psychol., 1908, XIX., 437–483.

This is an attempt to further standardize an important psychological measure, that of the maximum rate of repeated voluntary movements. The taps were made upon a telegraph key which was in circuit with a magnet recording upon smoked paper.

The subject began at a given signal and tapped at a maximum rate for thirty seconds; after a rest of two and one-half minutes another series was taken; and so on until a set of five such series had been obtained from each hand. The experiment was evaluated by counting the number of times the key was struck during each of the six five-second intervals of a series of thirty seconds.

The extremes of individual variation for ten unpracticed subjects were in initial rate approximately 2 : 1, in the gross rates for thirty seconds about 3 : 2; but it does not appear that this difference is related to general quickness, and beyond efficiency of coördination it is not known upon what normal condition it does depend.

The high gross rate in tapping does not, as has been pointed out, involve superiority in other aspects of motor speed.

Using Woodworth's 'index of right-handedness,' based on the ratio of the efficiency of the left hand to that of the right, the criterion in this case is the average number of taps, executed during five series of 30 seconds each. In the average, left hand does relatively better when it precedes than when it follows the right, which would be the case if the work with one hand had a fatiguing effect upon the speed of the other, but in the individual cases this is seen to be the product of certain coarse deviations in either direction, so that no general conclusion should be drawn. This index of right-handedness here varies between .81 and .94, and shows distinct points of individual difference.

In the right hand it is quite noticeable that the first two series are generally the poorest and that there is a well marked tendency for the later series to be faster than the earlier. To this phenomenon he applies the name of 'interserial warming up.' In the left hand it is by no means so evident that such a process exists. After the first few seconds, the rate

in the individual series progressively decreases, having, on the average, some six-sevenths as much speed during the last five seconds as in the first five, the curve following the form usual to fatigue curves. For the more thoroughly studied individuals the practice curve is everywhere gradual in ascent, not most rapid at the beginning, the opposite of what we usually expect. The practice curve of the left hand does not ascend more rapidly than the right. And variations from a parallel course seem to be due to the fact that each hand does relatively better if tested after rather than before the other. This suggests that the effects are of a general nature. Practice increases the effect of the warming-up tendency, which therefore shows itself much more in the later experiments than in the earlier. The intermissions of two weeks or less have no unfavorable effect on the practice gain beyond at first increasing fatigue sensations.

There is only a slight tendency to positive correlation in the fatigability of the different hands. The right hand is ordinarily more immune to fatigue than the left; but there are individual exceptions. Practice tends to affect the average 'index of fatigue' of the left hand more favorably than that of the right. Initial rate and fatigability are negatively correlated, a fast initial rate being usually accompanied by a high fatigue loss. Fatigue tends in all respects to decrease variability. No consistent effect on variability due specifically to 'warming-up' or practice can be traced. The mean variation in the right hand tends to be larger than that for the left hand.

The subjective condition as estimated by an individual practiced in introspection bore no traceable relationship to the gross rate; it seemed, however, that the susceptibility to fatigue was greater when the grade assigned was good than when it was poor. Subjective condition and initial rate are more closely correlated.

Practice decreases the ratio of the period during which the key is held down to that during which it is released.

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FATIGUE AND DRUGS.

The Influence of Alcohol and Other Drugs on Fatigue. W. H. R. RIVERS. The Croonian Lectures, 1906. London, Arnold, 1908. Pp. viii + 136.

Although primarily undertaken to demonstrate the pharmacological action of drugs on the neuromuscular apparatus, the present work of Rivers is of considerable psychological interest because it shows con-

clusively a preponderating influence of suggestion in the actions of certain drugs. In the introductory lecture the author says that in selecting such a topic one of his objects was to show that experimental psychology has a practical side and that it may be of service to medicine. That he has succeeded in establishing this fact there can be no doubt. Beyond noting the occurrence of idiosyncrasies for certain drugs the individual differences in the actions of drugs have not hitherto been carefully considered by pharmacologists. The work of Rivers clearly shows that in such a comparatively simple mechanism as the neuromuscular apparatus the divergencies of drug effect are quite marked and the differences are such as we expect in other work of a non-pharmacological but of a more strictly psychological nature.

The lectures take up the actions of the following drugs: caffeine, alcohol, tobacco, cocaine and strychnine. The method used by Rivers for testing neuromuscular fatigue is a modified form of the Mosso method. In one series of experiments three sets of fatigue curves were made, at intervals of thirty to sixty minutes, each set comprising six fatigue curves. The individual curves were made at intervals of two minutes, and the separate contractions were made every two seconds. The curves on any one day were carefully compared with those of the other days, but on each day before a drug was given one normal fatigue curve was recorded as a control. A comparison was then made between the five following curves and the normal. The amounts of work in the successive fatigue periods, the average heights of the contractions, and the numbers of contractions were used as the basis on which to estimate the action of the special drug under investigation. Three methods of estimating mental fatigue were employed: the multiplication of four numbers mentally and writing the final figure of the product; the amount and the accuracy of typewriting; fatigue of attention.

An important, and in previous work almost neglected precaution to obviate the suggestive effect of the drug was that on the normal days mixtures were given similar in taste to the drug mixtures. In carrying on the series of experiments in this way the subject did not know when the drugs were given, excepting tobacco, and the factor of suggestion was minimized. It is probably for this reason that Rivers' results do not generally confirm the results of previous investigators. From a pharmacological standpoint the differences are interesting and perhaps important, but it must be remembered that, therapeutically, the physician is aided as much, if not more, by the suggestion of drug action as by the real action of the medicine.

Caffeine was found to have a decided action upon the amount of work performed, when it was taken in doses of 0.3 to 0.5 gram. It was found to stimulate the capacity for muscular work; in one subject this increased ability continued throughout the series of experiments, in the other subject there was found an initial increase in amount, followed by a decided decrease and even a fall below the normal level. The effects on the neuromuscular apparatus can be said to be independent of suggestion, interest, etc., as has been noted above, and the differences in action on the two subjects can be explained only by assuming a difference in physiological action, in one case as an accelerator of fatigue, in the other as a supporter of the nerve-muscle. In the typewriting experiment there was an increase in the amount of work on the caffeine days, and on these days there was about the same number of errors as on the normal days. The decidedly greater effect on neuromuscular work is taken to indicate a peripheral action of the drug as well as a central action.

The effect of small doses of alcohol — 5 to 20 c.c. — reported by previous workers was not confirmed by Rivers, The absence or the slightness of differences between his results on the alcohol and on the control days and the apparently marked effects found by other investigators are explained by the author to be due to the interest aroused in the previous experiments and to the stimulation obtained from swallowing the drug. The previous work in which alcohol is reported to have decreased the amount of work is dismissed by Rivers in his conclusion that all these workers have been influenced by suggestion. Observation tends to support this conclusion, for even in individuals habituated to alcohol small doses of whisky or brandy, containing not more than 5 to 10 c.c. of absolute alcohol, are found to be very efficacious in producing sleep and other effects which cannot be due to the action of alcohol alone. In the use of such small doses the author did not find any of the immediate effect which has been so prominent a finding of others, and it should also be noted that an immediate effect was not found even with the larger doses, 40 c.c. absolute alcohol, used by him.

Larger doses of alcohol were found to be followed by an increase in the amount of work, and "there was no trace of any decrease following the increase which other workers have found, although the experiment was continued much longer than in any previous research." This result is the more noteworthy, since on the days on which the large doses of alcohol were taken the subjects experienced giddiness and other symptoms. An objection to the conclusion of Rivers, which the reviewer believes to be correct, may be made by the anti-alcoholic ex-

perimenters, viz., that Rivers was aware of the nature of the drug because of the giddiness, etc., and that this fact made him and his other subject more anxious to work harder. The effect of the alcohol on the fatigue curve was found to be on the number of the contractions and not upon the height of the contractions.

On mental work the effect of alcohol is in the direction of decrease in working capacity. This was particularly noticeable when the records for a period of eight days were examined. Throughout this period there was a falling off in the amount of work, although practice should have given an increase. The lessened ability was found to exist during the succeeding five days on which no alcohol was taken, and was further increased on two succeeding days on which further doses of alcohol were given. It should be noted that these results are not constant for all individuals, and in fact "even the large dose of 100 c.c. failed to show any effect in some persons."

No personal work is recorded in the section dealing with the effects of cocaine; strychnine effects are reported from the experiments of Jones, which show a rapid rise in the amount of work on the days when large doses were taken, with small rises in the curve when small doses were taken. A peculiarity of all the strychnine experiments is that the rise, which comes early, is followed by a reaction of decrease in amount of work.

The method of taking tobacco could not be disguised, or rather no control experiments have been reported, and any mental influence must have had full sway. Smoking was followed by a decrease in ability, although the amount of the decrease is well within the limits of normal variability.

The book closes with five appendices giving discussions of the following: form of the curve representing the course of fatigue; new apparatus for studying mental fatigue; general effects of caffeine; effects of alcohol; and the multiplication method.

On the psychological side the work gives some accurate results regarding fatigue phenomena, but the reviewer believes the main value of the book and the lectures is that there has been demonstrated the applicability and importance of psychological methods in pharmacological research. In other words, the main value of the work is that it gives a new method or a new viewpoint for the future work on the action of different medicinal agents on man. It has placed in the hands of the pharmacologist a means whereby 'the hidden nature of the objects with which he experiments' may be discovered. It makes possible the accumulation of data of practical and theoretical value by many, and

the value of the present work is not to be measured by the small amount of results and theoretic conclusions which are drawn from the experimental findings. In this connection the reviewer may be pardoned for emphasizing the point since he was prominently criticized for it on another occasion (see PSYCHOLOGICAL REVIEW, 1908, Vol. XV., pp. 6–7), and since he believes many philosophers and introspective psychologists may hold the same view of the matter as his critic. In all sciences, for the increase of knowledge, to attain something more than a mere accumulation of discrete facts, ways of looking at the facts are necessary, methods of discovering them are essential and plans required. Given a method or a plan or a viewpoint, many are able to collect facts with some definite purpose for the understanding of the intimate structure of nerve cells, for example; or for the understanding of the world, in a pragmatic way; or for a dynamic interpretation of mental processes. This method, not necessarily the individual piece of apparatus, is what is needed in psychology as in other sciences, so that we may "look beneath the superficial, in search of the more fundamental."

SHEPHERD IVORY FRANZ.

GEORGE WASHINGTON UNIVERSITY.

SLEEP AND HYPNOSIS.

An Experimental Study of Sleep. BORIS SIDIS. J. of Abnormal Psychol., III., 1–32, 63–96, 170–199.

Sleep and hypnosis can both be produced by monotony, by limitation of voluntary movements, limitation of the field of consciousness and inhibition. In hypnosis there is fixation of the attention and suggestibility, and an increased facility of reactions to external stimulations. In sleep there is relaxation of the attention, absence of suggestibility and almost complete suppression of the more complex reactions associated with mental processes.

Sidis, by the method which he terms hypnoidization, induces states which are allied to sleep on the one hand, and to hypnosis on the other. He thus utilizes conditions favorable to both sleep and hypnosis, with the exception that the subject is asked to fixate his attention instead of relaxing it. After a time the patient's pulse and respiration are somewhat lowered. He is often cataleptic and is in an unstable condition that falls now into sleep, then into wakefulness and again into hypnosis. These facts were the basis of experiments made on frogs, guinea pigs, cats, dogs, children and adults. The same methods were used with all of the animals. The condition induced in frogs was not typical sleep as observed in human beings.

Before the frogs fell into a state of prolonged passiveness they went through an intermediate stage which was highly unstable and varied from catalepsy to lethargy, and again from passivity to activity. The general characteristics of the condition corresponded to those of the hypnoidal state in man. A hypnoidal state that more and more closely resembled the phenomena observed in man, as the animal advanced in the scale, was found to precede and succeed the sleep of guinea pigs, cats, dogs and children.

Sidis believes that the hypnoidal is the primitive rest state out of which sleep and hypnosis have developed. Real sleep would too often prove fatal to the lower animals. They must be ready to jump and run or feign death through catalepsy at a moment's notice.

In developing an interpretation of these phenomena the author goes back to Weber's law and says that as the cells respond with less and less energy to stimulation the threshold rises and the stimulus falls out of consciousness. Although the cell may yet have a great deal of energy, that particular stimulus cannot call it forth. In other words, the cell is asleep as regards that stimulus. The periods of response to stimuli are waking states. It is readily seen, therefore, why monotony is essential to producing sleep. In hypnosis, stimuli are responded to with greater facility and the state is one of dissociation. In the hypnoidal state there is a redistribution of energy. If the result of this redistribution is a readiness to respond to stimuli and to further deplete the store of cellular energy, the state is hypnosis, but if the new condition allows no response to stimuli and brings about restoration of cellular energy, it is sleep.

ALICE PICKEL.

WASHINGTON UNIVERSITY, ST. LOUIS.

SUGGESTION.

The Effect of Suggestion upon the Reproduction of Triangles and Point Distances. J. CARLETON BELL, assisted by G. E. HATCH and L. T. OHR. Amer. Journal of Psychol., XIX., 504–518.

After a short sketch of work done by other investigators, our author describes the procedure and results of his experimental investigation of the problem. In the first series of experiments a set of triangles of 10 cm. base and varying in height from 49 to 100 mm. were exposed serially before observers sitting 2 m. from the object. At the moment of exposure an auditory suggestion was given, *e. g.*, 'make high' or 'make low,' and the observer was asked to make no conscious opposition to the suggestion, but to mark by a pencil dot the position

where he thought that the apex of the triangle should be. A card was provided for this purpose on which the base line had been drawn. The series was repeated with a visual suggestion — a diamond-shaped outline, the long axis 20 cm. and the short one 4 cm. being exposed immediately before the triangle which was to be reproduced. For the 'high' suggestion it appeared with the long axis vertical and for the 'low' with the long axis in the horizontal direction. A standard for the purpose of comparison was supplied by making occasional series in which no suggestion was offered.

Six observers took part in the experiment, and judgments of each form with each triangle were made. Auditory suggestion, 'high' resulted in only two of the observers making a reproduction of the distance between the base and apex of the triangles greater than the standard. 'Suggestion low' was more effective, 5 out of 6 making a reproduction below the standard. In the case of visual suggestion, 'low' was effective five times out of the six, 'high' was not effective.

Slight modifications in the stimulus gave results which showed considerably less uniformity than in the case of the first set of experiments.

The conclusion of the author is that the most potent factor in suggestion is 'the arousing of an expectant attitude of attention.' In the present case that factor is almost eliminated, and the mere sensory stimulus which is left does not produce very constant results.

F. S. WRINCH.

UNIVERSITY OF CALIFORNIA.

VISUAL ILLUSIONS.

The Illusion of Compared Horizontal and Vertical Lines. G. DAWES HICKS and W. H. R. RIVERS. Brit. J. of Psychol., 1908, II., 243–260.

This investigation was undertaken with the purpose of answering the question whether or not the sensations arising from movements of the eye play any part in the production of the illusion which arises when the length of a vertical line is compared with that of a horizontal line.

The commonly accepted explanation of the tendency under these conditions to overestimate the length of the vertical line has been that vertical eye movements are more difficult than horizontal because a greater number of muscles are involved. As the explanation assumes that muscular effort furnishes the criterion of the movement, the illusion seems to be the natural result.

The experiments designed to test the validity of this theory consisted in studying the effect upon the illusion of prolonged and momentary exposure of vertical and horizontal lines. The method employed was to exhibit a vertical and a horizontal line at right-angles to one another so that the figure resembled the letter L. A simple apparatus was contrived by which the length of either line could be varied at will and the time of exposure easily controlled. The momentary exposures were less than one-fiftieth of a second — short enough apparently to exclude all eye movements necessary to the estimation of the length of the lines on the muscular effort theory. Observations were made with constant horizontal and varying vertical, as well as with constant vertical and varying horizontal lines.

In the first series of observations the investigators served also as subjects, but as their knowledge of the conditions of the experiment introduced a disturbing factor, a further series was arranged in which five men unacquainted with the problem acted as subjects. This series was continued for fifteen days. In each instance the observer was asked to name the line which seemed to him the longer, or to say when he could discern the difference.

The general result of this series confirmed that of the preliminary experiments. The illusion was quite as effective when the lines were exposed momentarily as when the exposure was prolonged. But the number of positive judgments was decidedly greater with the momentary than with the prolonged exposures. With the momentary exposures the difference in the lengths of the lines was decisive, but in the prolonged it was often very difficult to come to a decision, and the uncertainty was clearly due to hesitation and oscillation of judgment. The greater definiteness of the answers with the momentary exposures seems significant, though the total number of right and wrong answers showed no difference. The illusion was, however, in each instance more definite and decided with the momentary than with the prolonged exposure. The explanation given to this fact by the investigators is, that in the former case the immediate answers were based purely on the sensory data, while with the prolonged exposures the answers were the results of the complication introduced by such factors as knowledge about the nature of the illusion, experience arising from instruction in drawing, and other like elements of knowledge. It thus appears that culture introduces somewhat of a problem here, for the average man has a fund of knowledge which necessarily influences his interpretation. It became very evident that more definite and consistent results could be obtained in observations on illusions from

people of low culture than from civilized observers. This confirms former observations made by Mr. Rivers on the inhabitants of Torres Straits.

The results of the investigation seem to be a very decided answer to the question involved, and point to the conclusion that the illusion was not due to the influence of movement factors, since the illusion is present in an equal or greater degree when no eye movements, effective for such judgments, could occur.

The objection may be made that although movements were not actually carried out in the apprehension of the momentarily exposed figure, the genesis of such illusion may have been originally due to such movement, and in the experiments the influence of previously acquired experience could not be excluded. Yet it is difficult to see how the results of the investigation can be reconciled with the hypothesis that ascribes the illusion to the influence of eye movements.

MARGARET THOMPSON.
WASHINGTON UNIVERSITY, ST. LOUIS.

The Effect of Practice on the Perception of the Müller-Lyer Illusion. E. O. LEWIS. British Journal of Psychol., 1908, II., 294–306.

The aim of this investigation was to determine the amount of the illusion when the figures were exposed for prolonged and momentary periods, and to find the influence of practice in the prolonged and momentary observations.

Two plates were used for projecting the figures on a screen. The first was cut so as to form the Brentano figure, in which a straight line AC, bisected by an arrow head with the vertex pointing to the right, has also arrow heads at A and C, the vertices in each of these two cases pointing to the left. In this figure, as is well known, one half of the line AC appears longer than the other. In the second plate two separate lines of equal length have arrow heads at their extremities, the vertices in one case pointing inward and in the other outward. Light passing through the apertures of these plates was conducted through lenses and thrown upon a screen. The plates were constructed with grooves, so that the lines might be made longer or shorter, or remain equal. In the first (Brentano) figure, one portion of the line remained of fixed length while the other was varied, and in the second figure one of the two lines was made the standard by which the other was estimated. The difference in the length of the lines was mechanically measured and afterwards compared with the judgments of the subjects, whose accuracy of observation was, of course, disturbed by

the illusion caused by the oblique lines. The duration of the images flashed upon the screen was controlled so that it might be momentary or prolonged.

Four of the six subjects were acquainted with the nature of the illusion, but only the experimenter knew what the effect of practice would probably be. The investigation showed that the effect of practice upon momentary observations is too ambiguous for definite conclusions. In the case of prolonged exposures, however, practice caused the illusion to diminish and finally to disappear. The subjects stated that with practice the lines-to-be-compared became more prominent and hence the distraction caused by the oblique lines became less. Previous knowledge of the illusion did not seem to be of assistance in overcoming the illusion. The experimenter himself required more time than any of his non-informed subjects. The effect of practice upon the illusion was found to be somewhat permanent. If the second plate was reversed, thus putting the two lines in a different position with relation to each other, the illusion returned but was not so great, and was more easily overcome.

The tabulated readings show that the momentary illusion was greater than the prolonged, a fact that would seem to disprove Wundt's theory that the illusion is due to movements of the eyes. This greater sensitiveness in momentary observations indicates also that eye movements do not play so important a part as some have thought in the accurate measurement of spatial magnitudes.

The experimenter points out that, as the subjects were not aware of a change in their readings, notwithstanding the large change in the relative magnitudes of the lines, introspection cannot be relied upon in solving problems of genetic psychology.

HELEN PRITCHARD.

WASHINGTON UNIVERSITY, ST. LOUIS.

A New Visual Illusion of Direction. JAMES FRASER. British J. of Psychol., 1908, II., 307–320.

In this investigation the lines of the figures which produce the illusion "consist of a series of visibly discrete similar parts, all inclined at the same small angle to the line of direction of the series to which they belong," instead of being uninterrupted black or white lines on a contrasting background, the more usual structure of the visual illusion of direction figures. Fraser does not venture an explanation of the illusion which his numerous figures show, but he offers experimental evidence which seems to eliminate eye-movements

as a factor. This is indicated from the fact that the illusion is noticeable with light flashes of one-eighth to one-half of a second. He also found some peculiarities which differentiate it from the Zöllner illusion. For example, no definite suggestion of perspective is present, and, again, while the illusion is modified by steady fixation accompanied by peripheral attention, it is never abolished, as in the Zöllner illusion. Fraser is of the opinion that two 'visual integrative processes,' are factors in the illusion, one a confluent union, 'corresponding to a line joining the centers of areas of the units,' which becomes more evident the nearer the units of direction are to one another in serial position, and another, a process which represents collectively 'the trends or tendencies of the units' and is more noticeable the more clearly the units of direction are impressed upon the median or peripheral, rather than the central, portions of the retina.

EDGAR JAMES SWIFT.

WASHINGTON UNIVERSITY,
St. LOUIS.

PLATO ON THE WILL.

Plato's Psychology in its Bearing on the Development of Will. MARY HAY WOOD. Mind, 1908, XVII., 48–73, 193–213.

As it appears to the reviewer, this essay does not contain anything like a pure psychological discussion. Plato himself never attempted to write anything like psychology in the modern sense of the word. It seems, therefore, to have been the task of the writer to indicate the phases of psychology as found in his writings, and it is quite natural that she should not be able to expound it in modern psychological terms. In spite of the fact that it deals with psychical activity, it is rather metaphysical than psychological in its nature.

Psychical activity is discussed in four divisions: appetite, emotion, thought and reason, and will. This order proceeds from the lowest and the least developed faculty of mind, as Plato regards it, to the highest and the most developed one. While recognizing the great difficulty in a proper translation of the terms used in the discussions, the reviewer is inclined to think it somewhat improper to employ so many original terms with no attempt at translation, however inadequate.

The writer recognizes in the first place the treatment of *Will* by Plato, although he did not use that term. The relation of Plato's problem to that of Socrates, which is briefly mentioned, is followed by a discussion of Plato's conception of the essential characteristic of soul, as self-directing movement, the notion of movements as two-

fold, implying form and matter, the doctrine of changing in changeless, the self-movement as a divine creation, and its impulse as eternal. The writer regards as ill-founded the accusation that Plato divided the mind into faculties.

Desire, self-directing principle in man, is the general term for all manifestations or forms of movement; and the conception of *pleasure* is the unchecked, the limitless activity of soul. *Appetite* is regarded by Plato as the lowest, least true and least complete activity of soul, while *emotion* is the higher assimilative æsthetic activity, which works through imitation, and has receptivity and power of movement.

In discussing the growth and development of emotional elements, the writer points out Plato's emphasis upon the love of beauty. Plato says: "Mind can come to a knowledge of its own nature through sight and love of beauty, and love of beauty is the beginning of 'the heavenward pilgrimage.'" The development of reason is the development of the power of passing from many particulars of sense to the 'one universal reason.' This power of universal reason is fully developed in very few minds; all others are in a transitional state with a greater or less ascendency of the emotional elements in mental activity. But there is no fast line between the emotional and reasoning activity.

Plato holds that the clue to reason is found in the power of abstraction, which is analogous to that of the artist, and is manifested in its most elementary form in *number*. Reason is the full and final development of the soul's activity, while truth is seen to be the unifying principle which gives form to what was otherwise formless, simplicity to what was complex, and wholeness to what was discrete. The 'idea of the good' is just this harmony and simplicity. One can grasp no reality without the power of universal reason or principle, and this reason or thought is concerned with the whole soul.

Turning to the final topic of the will, the writer shows the essential conception of Plato. Plato regarded the will as found in the *wholeness of mental activity*, and reason alone is that power of discrimination which can duly analyze the whole into the parts, and again give to each part its place in the whole. The condition of self-mastery is the result of a growth of mind, and self-mastery is self-knowledge. Desire and emotion must be subordinate to reason, and in this way the mastery of self by self, 'training and being trained' by oneself, is possible. Reason is above all necessary to any stable development of *will*.

"The will of a community," Plato says, "originates in the will

of only the few who have attained a complete development of soul." Of the starting point of the series, the actual origin, says the writer, Plato gives no account save in myths, where it is attributed to the action of *Divine will and reason*, a will whose purpose and whose existence are the perfection of *beauty*, *harmony*, *and truth*.

TODA CHO.

UNIVERSITY OF MISSOURI.

REPORTS.

THE CLARK UNIVERSITY CONFERENCE.

From July 6 to 10, at the invitation of President G. Stanley Hall, a notable Conference on Child Welfare was held at Clark University. Its object was to bring together all organizations interested in the child out of school, to correlate what had already been accomplished and to organize in order to attain better future results. Two common needs were made apparent in the various addresses, first, the need for trained workers, which need the universities were urged to provide for by establishing such departments as the new Child Institute to be opened at Clark this fall; and secondly, the need of popularizing the knowledge already possessed, so that it will be accessible to the most ignorant parents. This, it was felt, can best be done by the establishment of a Federal Bureau at Washington.

The Conference organized itself permanently under the name of the Conference on Child Welfare and Research, its object being to encourage in every way the scientific study of children and the popularizing of the results of such study. It will meet annually, and all persons interested in these objects are eligible to membership on payment of the dues of one dollar.

The list of officers is still incomplete: President, G. Stanley Hall, Clark University; Secretary, Dr. Henry S. Curtis; Executive Committee: Mrs. Frederick Nihoff, President of the Mothers' Congress, Miss Patty Dill, Columbia University, Professor Livingston Farrand, Columbia University.

AMY E. TANNER.

BOOKS RECEIVED FROM AUGUST 5 TO SEPTEMBER 5.

Fifty Years of Darwinism. Centennial Addresses in Honor of Charles Darwin, Before the American Association for the Advancement of Science, Baltimore, Friday, January 1, 1909. New York, Holt, 1909. Pp. iii + 274. $2 *net.*

De l'Illusion, son Mécanisme psycho-social. ALBER. Pref. by R. MEUNIER. (Biblioth. de psychol. expér.) Paris, Bloud et Cie, 1909. Pp. 119.

La rééducation physique et psychique. Dr. LAVRAND. (Biblioth. de psychol. expér.) Paris, Bloud, 1909. Pp. 121.

Le Problème de l'Action: La Pratique Morale. GUSTAVE RODRIGUE. Paris, Alcan, 1909. Pp. iv + 203. 3 fr. 75.

Berkeley and Spiritual Realism. ALEXANDER CAMPBELL FRASER. London, Constable & Co., 1908. Pp. xi + 85. 1/ *net.*

Le Régime des Aliénés. FERNAND DUBIEF. Preface by Dr. BAJENOFF. Paris, Jules Rousset, 1909. Pp. 350. 3 fr. 50.

A Theory of the Genetic Basis of Appeal in Literature. HOMER CLYDE HOUSE, Ph.D. (Dissertation; University of Montana.) Lincoln, State Printing Co. Pp. 77.

Letters, Lectures, and Addresses of Charles Edward Garman. Edited by ELIZA M. GARMAN. Boston and New York, Houghton, Mifflin, 1909. Pp. xiii + 616. $3 *net.*

NOTES AND NEWS.

THE seventh International Congress for Psychology will be held in 1913, in the United States, the city to be determined later by the committee in charge. The following officers have been appointed: Honorary President, William James; President, J. Mark Baldwin; Vice-Presidents, E. B. Titchener, J. McK. Cattell; General Secretary, J. B. Watson. A report of the sixth Congress, held in Geneva last month, will appear in an early number of the BULLETIN.

THE Second Decennial Celebration of Clark University was held during the week of September 6 to 11. The department of Psychology celebrated the event by a series of lectures and conferences, the former by a number of eminent scientists, American and foreign.

PROFESSOR IRVING KING, of the University of Michigan, has been made assistant professor of education in the State University of Iowa.

PROFESSOR J. MARK BALDWIN has been made Docteur ès science, causa honoris, of the Geneva University.

MR. H. C. MCCOMAS, A.M., has been appointed demonstrator in psychology at Princeton University.

THE following are taken from the press:

PROFESSOR G. H. HOWISON has been made professor emeritus of philosophy at the University of California.

DR. RAYMOND H. STETSON, of Beloit College, has been appointed professor of psychology at Oberlin College.

DR. FRANK N. FREEMAN, for the past year traveling fellow in philosophy and psychology of Yale University, has been appointed instructor in educational psychology in the University of Chicago.

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THE

PSYCHOLOGICAL BULLETIN

THE OPPONENTS OF ETERNAL VALUES.

BY PROFESSOR HUGO MÜNSTERBERG,

Harvard University.

The two largest volumes which have been devoted to the problem of values in recent years have by chance appeared before the English public in the same week, Professor Urban's admirable book, *Valuation, Its Nature and Laws*, and my volume, *The Eternal Values*. They supplement each other completely, representing the two fundamental aspects under which the problem of values can be studied. Professor Urban's work is positivistic and the other is idealistic; the one therefore deals with the relativistic aspect of our values, the other with the values as absolute realities; the one is psychological, the other epistemological; the one analyzes and explains the facts, the other aims towards a teleological system. There is no prospect of a mastery of this most central problem of philosophical thought unless both sides of it are clearly separated, understood in their meaning and cleanly contrasted. There is no solution possible as long as only the one side is considered and the other carelessly ignored. Both the relativist and the absolutist must somehow dispose of his opponent.

To be sure the attitude of the adversaries is naturally very different. The absolutist has not the slightest intention of denying the value of the relativistic construction. On the contrary he must find in his own system fullest room for the free unfolding of the relativistic knowledge. The relativist, on the other hand, must entirely exclude the absolutistic claim from his precincts. The absolute is then nothing but an empty abstraction, an arbitrary idealization of a social demand. Even if such an abstraction proves to be useful as a crystallization point for social synergy, it remains strictly relative. The idealist accepts and appreciates accordingly the psychosociological studies of the relativist; the relativist on the other hand by principle rejects the sys-

tem of absolute values. For this reason I feel in hearty sympathy with most of that which Professor Urban proclaims. His psychological descriptions and his axiological developments seem to me helpful and true up to the point where they are presented as an ultimate philosophy. It was therefore my intention to express my interest and sympathy with the suggestive work in a review which would have shown our far-reaching agreement in all those problems which are his and which alone can be his from his psychological point of view.

But Professor Urban, evidently sharing with me the conviction that clearness demands the sharpest possible expression of the contrasts in our attitudes, as editor of this Value-number of the BULLETIN has invited me rather to emphasize more the idealistic tendency of my own book and thus to bring it into sharper relief. He proposed to me for that purpose that I answer some of the objections which have been raised against my philosophical volume. To be sure the English edition of *The Eternal Values* is already itself meant as an answer to some critical arguments which have been raised against its German predecessor, *Philosophie der Werte*. The English version is indeed by no means a mere translation. It leaves out much from the German text which the student of epistemology would easily have recognized as esoteric discussions with Windelband, Rickert, Husserl, Simmel and others, although no names are mentioned. On the other hand, it contains a large number of additions which defend my position against the arguments especially of the American reviewers of my German book.

Of course I cannot restate here the idealistic view of the problems of value. I may differ in this respect from my readers, but I certainly found the four hundred and thirty pages of my volume by far too few to give full expression to the central thought; I cannot hope suddenly to do better in a hundredth part of that space. Nor have I the slightest interest in answering with any serious arguments those stray reviews which abstain from discussing my book and which substitute for it some cheap caricature. The climax of such uncritical criticism was reached by Mr. G. E. Moore, in London, in an article which, strangely enough, has found its way into *The International Journal of Ethics*. I gladly yield to the fate which makes my philosophy to such a reviewer more or less a conglomeration of purely fantastic hypotheses. Needless to say, such a complacent method would have no more difficulty in demolishing all the metaphysical systems from Plato to Hegel. I look rather to the long series of thoughtful essays which, especially in Germany and America, have been devoted to my philosophical effort

and which, often with generous overestimation, have entered into its spirit and its work, and yet have found earnest objections.

May I begin with one argument which repeatedly took a strictly personal form and yet which has general bearing. Again and again I had to read that my philosophy is contradictory to the results of psychological analysis; and the personal flavor was given to this argument by kindly reminding me that I am professionally a psychologist and that my first books, notably my *Willenshandlung*, tore in pieces that same will for which I now claim metaphysical unity. Perhaps this finds its sharpest expression in Professor Stein's excellent book *Philosophische Strömungen der Gegenwart*, in which he devotes the chief part of the first chapter on neo-idealism to a most brilliant and interesting analysis of my book. He places me wrongly, I think, in bringing my system too near to Hegel and by this underestimating my close affiliation to Fichte. And now he says: "The most curious factor in this turning of the twentieth century toward Hegelian philosophy is the historical caprice that this renaissance of Hegel begins with such a radical psychologist as Münsterberg was in his youth, and is thus introduced by the exact experimental psychology which usually has had only a condescending smile of ridicule for all metaphysics." And again he says: "The architecture of Münsterberg's book shows a power of systematization and constructive finesse together with an energy of thought which shifts the experimental psychologist into the first rank of our scholarly metaphysicians."

Stein and all the others who have lingered at this apparent contrast ought to see that there is no contradiction in thought and not even a contradiction in my personal life. I do not feel in the least removed from the lines of the experimental psychologists since I have tried to embed my psychology into a philosophical system and I may add that there was never a time that I did not see the need of this wider perspective. I am happy to say that I even have my evidence in print. That disrespectful book of my youth, *Die Willenshandlung*, did indeed try to show a way which since that time has become a familiar road for most psychologists. It decomposed the volition into sensations and affections and utterly denied the existence of a special psychological will element. But this very book ends with the statement that nothing but sensations and feelings compose the will 'in the metaphysical reality of which there lies the deepest problem of existence.' I do not want to give the impression that in my student days when I wrote that sentence I had a metaphysical system of my own in mind; yet it was written twenty years ago essentially under the influence of

Fichte's philosophy. It clearly shows that my analysis aimed to be consistent but was unwilling to turn into a philosophical psychologism. Moreover, ten years later when I wrote my *Grundzüge der Psychologie* the teleological aspect of reality had already been brought to its most insistent expression; and yet the description of the psychological will was again essentially in the same terms in which my first book presented it.

I have no reason to withdraw anything from the results of my previous psychological analysis. More than that, just from the discussion of my opponents I see that such a radical psychological analysis is the safest way to a clear insight into the teleological character of the reality of will. That which too often stands in the way is simply a lack of consistency. Too often the will is treated in the spirit of causal analysis, and yet instead of carrying this principle of science through to the last elements, a hesitation sets in and a kind of inconsistent teleology is mixed into the psychological description. The psychologist must go to the very end until he really reaches the psychical atoms. Then he will have no difficulty in seeing that this combination of psychical elements is not at all that which he means by the will of his real life activity. Just then he will discover the teleological character of his will in its purity and will see that this real will, as alone it comes in question for our immediate life, is not at all a possible object of description and explanation but has meaning only in its unity and in its reference to purposes. Consistent psychological atomism of the will and radical teleological philosophy of the will belong most intimately together, and in going back today to the writings of the great idealists from Kant to Hegel, we instinctively feel that an element of weakness enters into their argumentation from the fact that the psychology of that time was still far from a consistent analysis of mental life as mere psychological causal phenomena.

In this sense it is no less misleading, if the timeworn objection of double bookkeeping is raised against me. The real will which comes in question as an act of meaning, agreeing and disagreeing with others, obeying or disobeying ideals, is never that phenomenon which the descriptive psychologist analyzes, because it is never a phenomenon, and therefore there are not two different entries made for it. That material which the psychologist finds lies entirely in the world of existing objects; it is a mental accompaniment of physical processes, material of awareness for a passive consciousness, in short, an object. The relation between the real will and the will of the psychologist is one of definite dependence. It is the subject of will in its immediate

reality which turns towards the logical purpose of conceiving the whole of reality and therefore also the psychophysical actions of the organism in the thought form of existing independent objects. The reality of such scientific material is thus completely dependent upon the purposive activity of the will. To assert existence for a mental experience thus means already to have given to it a certain valuation and therefore presupposes a subject whose decisions are controlled by real values. If I ignore this fundamental fact of real life and simply treat the existence of objects and their givenness as the ultimate fact of reality, then of course I must come into a conflict between object and subject which is most conveniently solved in the superficial manner of positivism. Then again objects are simply posited as the only reality and the subjective purposive act becomes itself a function or a product of the objects. In that case the idea of an absolute determination of purpose indeed becomes a fantastic illusion.

The recognition that givenness of the objects and their existence involves valuation seems to me the very first step towards a theory of values. At least that alone opens to such neo-Fichtean philosophy the possibility of coördinating the æsthetic and moral experiences with the logical one and of brushing away the prejudice that existence is a more fundamental category than, for instance, beauty. No system which begins with existence as ultimate fact can ever do justice to the autonomy of the non-logical realities. Is it really an objection if one of my critics exclaims that I demand for the beautiful creation the fullest reality and yet deny to it real existence? Its æsthetic reality is just as valid as the existence reality of the physical thing. They are coördinated autonomous fulfilments of the ideal will, but the one is never the other. In so far as the experience is beautiful it has no physical existence. Hence, it really does not touch me if Mr. Moore as the climax of his contempt denounces me as 'maintaining that colors and tones and musical notes all have volitions,' while 'there is nothing in observation to support it.' He is quite right. From the standpoint of psychological observation there is not the slightest chance of finding a psychophysical volition in the melodies and curves and colors, and he who claims to find them ignores 'observations.' And yet the only scholarly magazine devoted to æsthetics, the *Zeitschrift für Aesthetik*, begins its essay on my book with the statement that "rarely has anyone come so near to the real æsthetic experience and to the meaning of the æsthetic as Hugo Münsterberg in the æsthetic part of his *Philosophie der Werte*. And this because he boldly makes a sharp demarcation line between the theoretical and the æsthetic valu-

ation, and he does it so fully that even a psychological æsthetics with its conceptional constructions vanishes like a world of ghosts when seen from the standpoint of such really living valuation."

But the opponents of absolute values are certainly not confined to the circle of those who begin with the objects instead of the subjects. Those who are ready to interpret reality in voluntaristic spirit and to acknowledge the fundamental character of the purposive activity may yet insist that we can never transcend the relativism of personal interests. Some of the cleverest objections raised against the neo-idealism characterize the situation even as if we were again simply falling into the traps of the typical ontological arguments. The reality of God's existence was proved by the fact that we necessarily think of God. In the same way the reality of absolute values is now to be proven by the fact that we feel obliged to demand them. The ontological argument is thus simply moved from reason to will and the fallacies of the argument must remain the same. Yet this again is a complete misunderstanding. Whoever understands absolute idealism from its epistemological center must see that the analogy with the ontological proof does not hold in the least. Every beginner in the study of critical philosophy knows that our thinking can indeed never prove the reality of anything which lies beyond experience, but that on the other hand the form and connection of the experienced world is absolutely given by the conditions of our experiencing subjectivity. That which is necessarily postulated as constituting experience cannot be unreal in our possible experience. The same critique which once for all demolished the ontological argument has proved to us the absolute character of those relations in nature which are posited by the category of the understanding. If now it can be shown that the subject function by which the experience becomes constituted as an objective, existing world is ultimately will activity and that the same will activity constitutes besides this knowable world the æsthetic and the moral world: we certainly do not resuscitate the ontological argument, if we insist that the categories of this will determine absolutely the worlds of truth and beauty and morality.

Absolute idealism does not claim the absolute reality of the eternal goods for any world beyond our world of ethical, æsthetic and logical experience. It would not even have any possible interest in anything which is conceived as existing outside of the world of experience, inasmuch as such mysterious knowledge would have meaning only if we go back again to the precritical idea of existence. If an idealist were to fancy that those absolute goods were eternally existing things last-

ing through all ages, the absurdity would be hardly worth combating. The eternal values are not existing but are valid; they are not valid for a world beyond experience but for an experience which becomes a world only through the organizing activity of our will. Certain values must belong absolutely to the only possible world of ours, if it can be shown that the will which organizes the chaos of our reality into our world finds a world only in so far as those goods are realized. The whole effort of my idealism is to demonstrate that the deepest nature of our purposive activity involves a fundamental demand which must be fulfilled in order to find a world at all. Only in so far as experience fulfills this demand can we speak of a world, and therefore we have the right to presuppose *a priori* that those features which fulfill it hold eternally and absolutely for the only possible world of experience.

All our striving and seeking and pragmatic doing is thus determined beforehand by the absolute power of that which must have eternal validity for the building up of the real world, because it belongs to the world-building will itself. The individual and the social will which seek truth, beauty, morality and religion are therefore absolutely controlled by the overindividual demand of the general will to have a world at all. Whoever does not will to have a world but is satisfied with living through a dream and a chaos, cannot possibly enter into our discussion of that which is absolutely or relatively valuable in our world. On the other hand, he who seeks a world must find in that world a realization of all the various aspects which the fundamental will towards a world offers. It is the real labor of my book to show that those various aspects which we call truth and harmony and beauty and progress and law and morality and religion and so on are indeed only different aspects of that one fundamental demand. This proof, which I might claim to be an empirical proof if the word is rightly understood, is the essential new contribution of my book.

If the task is understood in this way, it is evident that the form of the rigid system is the only appropriate one. I know quite well that in the days of our impressionistic philosophizing the architecture of an exactly constructed system seems clumsy and pedantic. I know as well as my critics that life is full of transitions and does not know sharp demarcation lines and that every conceptional system seems to ignore the tints and shades of our real life; but I know still better that it is not the philosopher's task simply to live life, but rather to understand it and to bring order into the manifold. Those demarcation lines of the system are certainly artificial, just as the dimensions of

geometry are artificially selected; logical thought cannot dispense with them.

To be sure, all this involves that the organization of experience which we call beauty or progress or morality or truth be recognized by the idealist as an approach towards a definite ideal which can be deduced from the character of the overindividual will. Some pragmatists have denied that I have succeeded in showing such definite standards. Professor James in his recent essay, 'An Abuse of Abstractions' (*Popular Science Monthly*), where his finest fighting spirit turns his weapons against Rickert and me, insists that I have nothing to show but the general proposition that 'there is absolute truth.' The pragmatists, he says, articulately define the meaning of truth. They define even that which for their private purposes they call absolute truth. Truth absolute would be for the pragmatist an ideal of formulations towards which opinions in the long run of experience may be expected to converge. In short, in the midst of his individualistic account of truth he has at least a kind of social standard. It is evidently a standard similar to the economic standard for the market price. We misled idealists on the other hand do not know anything about the truth, but live simply in a naïve confidence that there exists an absolute truth without our ever being able to say of what it consists. It is here that my 'vicious abstractionism becomes most apparent.'

I am afraid that the only thing which is really most apparent is that I did not succeed in the German edition of my book in making at all clear what the one hundred and fifty pages on the logical values meant to express. My only hope must be that the English version which enters more fully into the fallacies of pragmatism may make it clearer that such an objection stands in contradiction to every page of the book. I have discussed there the truth of natural science and of history, of logic and mathematics; in short, for every group of true judgments I have with the greatest possible carefulness shown exactly what constitutes the character of the specific truth and have demonstrated that all these particular forms have one common trait which has its origin in the fundamental structure of our world-positing will and is therefore binding for eternity on every individual who seeks truth. My whole discussion of knowledge, which forms an essential part of the book, is an effort to go beyond the mere statement that there is truth. This general truth, that truth if it exists at all is absolute, would even be worthless for the special purposes of my system which needs an answer for just that question, of what specific characteristics does

truth consist. That general proposition, 'there is absolute truth,' for me stands only as an expression of the minimum requirement for the truth-seeker. He who does not accept it, we idealists insist, negates himself, and we saw in that the very first fact which brushes aside all pragmatism and all relativism.

I repeat that we idealists are therefore no less interested in the psychological and sociological studies which make the truthseeking process the object of scientific analysis, and I for one should completely accept all the opinions of the pragmatists and positivists as long as they want to describe by their account a part of the history of human civilization and do not aim to give us a philosophy. Exactly the same holds, of course, for all those antagonists of eternal values who focus their interest on the ethical problems. They show us how all human doing is the satisfaction of individual interests, and how a social synergy sets in and how in the interests of moral economy the satisfaction necessarily more and more takes that shape which we call the moral life. But all such positivistic ethics, completely true as part of social psychology, again leaves out of account that which to the idealist is the only real problem, the meaning of duty. If our moral behavior is nothing but a more complex prudence, developed in order to satisfy the greatest number of individual interests, there is indeed not the slightest trace of any absolute value involved. But such an account simply ignores the fundamental question of ethics. How do I come to feel bound by demands for interests which are not my own? If I gave to this simply the psychologizing reply of the ethical pragmatist, I should explode every conviction of obligation. I can accept every word of such psychological logic and ethics, and yet stand exactly where I stood at the first page of my book, seeing all the real philosophical problems before me. The philosophy of truth and beauty and morality and religion can no longer be reached in our time simply by analyzing social phenomena and bringing them into axiological connections.

There must be no delusion. We simply must once more force on our present-day relativism the fundamental categories of critical philosophy: we must go back to Kant and from Kant to Fichte, unless we want to stop at the level of the eighteenth century. This does not mean that we ought to repeat the terms and externalities of those classical systems. Each time must make use of the progress which science and life have secured. We cannot return to Kant and Fichte without remembering what psychology and natural science have gained since their time. But the essential problems of true philosophy are unchanged.

This is not the party demand of a German for German philosophy. If an English biologist were demanding that we do not ignore the work of Darwin, it would not be a prejudice for British biology. Biologists may and must go beyond Darwin, but they cannot simply see things again with pre-Darwinian eyes and without answering the new problems at all. The critical philosophy is not German philosophy, it is rather *the* philosophy since the day that Kant performed for philosophy what Copernicus did for astronomy or Darwin for biology. We cannot simply look into the philosophical world with the eyes of Locke or Wolf; and yet that is again the fashion for too many here and abroad.

Back to Kant! Yes, we have courses on Kant in our universities, but usually they are courses against Kant, or rather against a caricature of Kant. The students leave them with a thoroughly superfluous knowledge of Kant's terms and classifications, together with either a condescending disapproval of his blunders or with a disgust at his absurdity. They have not the slightest idea of Kant's real problems; they have never lived through them, never seen them; they remain pre-Kantian as Spencer was or as Haeckel is or as the great majority of good people always will be.

There is no harm and much merit and charm in such brilliant discussions of truth and morality from an eighteenth century standpoint. For the practical affairs of the average man they are the most helpful and encouraging stimulations, and for the scholar they are highly valuable contributions to social psychology. Moreover, they can reach and aid much wider circles than the consistent investigations in critical philosophy which demand serious philosophical schooling and like higher mathematics can interest only a small number. Such discussions are much more to be recommended for the social organism. They are similar to the chemical innovations by which nowadays coffee without caffeine and tobacco without nicotine are brought to the market. He who sips and smokes these new-fashioned products ought to be glad to have them. They give him the pleasant feeling as if he were drinking coffee or smoking cigars, and yet they cause no discomfort to his nerves. But he must not think that he has there the real extracts of those curious plants when the decisive aromatic substances are eliminated. Logic without truth and ethics without duty and metaphysics without conviction and without absolute values have many advantages too. Only, again, he who sips them must not fancy that he has there the real extract from the leaves of the curious plant which we call philosophy.

KINDS OF VALUE OR CONSISTENCY.

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In his classic introduction to the *Microcosm* Lotze called attention to the wide chasm in modern life between labor and the things of the spirit, between science and appreciation, between economics and religion. In his *Studies in Logical Theory*, Dewey defines philosophy as a science of the method of experience, one of its chief problems being the relations of various kinds of reflective experience to each other, of science to esthetics, for example, and of both to economics, ethics and religion. No more important problem faces the philosophical critic of experience today, and we enthusiastically welcome the interest in it shown by some recent articles on meaning and value. Moore's discussion of Truth-Value,[1] that of Tufts on Ethical Value,[2] and that of Coe on Religious Value[3] are timely contributions to this subject, while Dewey's review of James's *Pragmatism*[4] and Montague's paper on The True, the Good and the Beautiful[5] present the main problem and make important suggestions toward its solution.

Under the caption, 'What Does Pragmatism Mean by Practical' (the review of James's *Pragmatism*), Dewey points out that "meaning will itself *mean* something quite different in the case of 'objects' from what it will in the case of 'ideas,' and for 'ideas' something quite different than in the case of 'truth.'" "In composing 'these different points of view' into a single pictorial whole, the *distinct* type of consequence and hence of meaning of practical appropriate to each has not been sufficiently emphasized." Dewey finds in James the necessary formula for each of three distinct kinds of meaning, 'the conceptual connotation or definition of an object,' 'the denotative existential reference of an idea,' and 'actual value or importance.' Correspondingly, the term practical means either 'the attitude and conduct exacted of us by objects,' 'the capacity and tendency of an idea to effect changes in prior existences,' or 'the desirable and unde-

[1] *Journal of Phil., Psy., and Sc. Meth.*, V., p. 429.
[2] *Ibid.*, V., p. 517.
[3] *Ibid.*, V., p. 253.
[4] *Ibid.*, IV., p. 85.
[5] *Ibid.*, VI., p. 233.

sirable quality of certain ends.' In the discussion of James's book Dewey notes a certain vagueness resulting from failure on James's part to clearly define in some cases just the kind of meaning of the term practical which he has in mind.

"Granting the right of the pragmatist to regard truth and beauty no less than goodness as forms of organic adjustment or equilibrium," Montague "would deny the conclusion that truth and beauty are therefore mere forms of goodness." "This new pragmatic method does not justify some of those who call themselves pragmatists in identifying or confounding together the types of value which we call the true, the good and the beautiful." The article is aimed at the humanists and especially, we take it, at Schiller, and Montague is perfectly justified in this criticism. The above statement assumes a definition of pragmatism which very few pragmatists will accept as even fair. Truth or logical value, the paper asserts, is the consistency of a particular judgment content with the total content of experience. The former must be 'harmonious with that general system of which it is a part.' This is to 'make the judgment accord with the environing facts.' (To the present writer these two propositions do not mean the same thing at all.) The good, on the other hand, is a matter of conation rather than cognition. Conation is satisfied when its object conforms to it, while cognition is satisfied when it conforms to its object. The content of judgment or cognition is *given to* the individual, while desire or conation *springs from* the individual. "The environment presents its demands to the individual as facts, while the individual presents his demands to the environment as desires." When the former demands are satisfied we have truth; when the latter are satisfied we have the good. The conative attitude is prospective: the cognitive, retrospective. Beauty is the permanently, objectively and universally pleasurable. The distinguishing thing about beauty as a kind of value is that it is a harmony between the organism and the environment which is neither enforced by the latter upon the former nor achieved by the former over the latter, but found as something that simply happens.

Professor Dewey's classification is of course a very different matter from Montague's, so different that nothing but the fact that both deal with kinds of meaning and point out the necessity of making distinctions enables us to mention them together. Montague's assertion that the object of judgment or cognition is *given to* the judgment, the doctrine that the objective content of judgment is also the stimulus and given datum of the judgment process, is entirely inconsistent with

Dewey's position and also, as it seems to the present writer, with the facts of experience. Moreover, the object as the bearer of logical values differs in this respect, that is, in the matter of not being given to the judgment process, not at all from the object as the bearer of ethical or esthetic values. Montague seems to hold that objects enforce or determine judgment, whereas in Dewey's view objects exact, not judgments, but attitudes and conduct. From Dewey's standpoint that which controls is, by virtue of its control, objective, but the reverse proposition that the object controls and determines judgment is one against which much of his writing has been directed. The character of tending to produce changes in the world of fact, which Dewey ascribes to ideas, Montague ascribes to desire or conation. Their views as to the third type of meaning have nothing in common. The presupposition of Montague's paper, that according to pragmatism all values can be defined in terms of an adjustment between the organism and its environment, is incompatable with Dewey's whole position, unless we ascribe to these terms something radically different from their literal biological meaning. It is not important to our purpose that we discuss these papers here at length after indicating their tenor.

In Moore's paper it is held that "truth-value is not the satisfaction of a special instinct coördinate with the other instincts, but that it is the value of the entire experience of readjusting conflicting values through the process of redistribution of values effected by interaction with a wider and *relatively* more permanent range of relevant values." The author is 'painfully aware of the extremely general character of all this,' and proceeds to mention a long list of questions which the paper leaves unanswered. "We say in one breath that truth is a value belonging to judgment as such, and in the next we speak of ethical, esthetic and economic judgments. Does truth then belong only to one kind of judgments? Or are ethical, esthetic and economic judgments special forms of truth? Or are they all coördinate values belonging to every judgment? Or are they all stages through which every judgment passes? And if so, what determines these stages?" These are just the questions as to types and kinds of value which must come into discussion more and more, and it marks a stage of progress when questions are definitely formulated.

One of the obstacles in the way of mutual understandings and general advance is the ambiguity with which such terms as existence, meaning, value, fact and idea are used by different writers. Some speak of existence and value as varieties of meaning, fact being practically synonymous with existence and reality being a comprehensive

term for the entire universe within which these distinctions arise. Then there are the terms evaluation and importance, which possess a different connotation. The present writer fell into the practice of using the term consistency as the equivalent of value, meaning the tendency of reflective experience in all of its phases to keep up and maintain itself. Truth is a vague term, as are also beauty and the good. So many kinds of value are covered by each that it is next to impossible to use these terms in a classification of values. Consider, for example, the kinds of value represented by such terms as continuity or system, discreteness or exactness, thoroughness or totality, and by such heuristic principles as identity, conditionedness and conservation. Which of these is truth and, if all of them, how are they related to each other? Certain it is that they are essential or constitutive characters of any conceivable objective world. But in what order are they to be mentioned in the description of such a world? How are the principles of identity, conditionedness and conservation related to continuity, discreteness and totality? We may have a word to say concerning these questions in the sequel.

In Tuft's paper on 'Ethical Value' it is assumed that value is always attributive to objects of consciousness, and ethical value to objects of ethical consciousness. *The* object of ethical consciousness is conduct as expressive of dispositions which make the results of the conduct desirable to the individual. Ethical value is always rational and social, possessing intellectual as well as affective and instinctive elements. It is 'judgmental' and may by abstraction be both described and felt. On its volitional or intellectual side ethical value (1) implies at least a formal subject, active in the process of choosing or valuing — the only unqualified good is the 'good will.' (2) Ethical values refer to a system of ends, to a single standard of value. To economics 'all wants look alike,' but the world of morality is a unified whole in which various ends, each desirable in itself, require revision and reconstruction to become parts of a single personality. Hence the moral world has its law of contradiction just as the world of truth has. (3) Two *kinds* of choices characterize the moral world, namely, (*a*) that between the 'higher' and 'lower,' coinciding in part with the distinction between the more rational or ideal and the more immediate or sensuous, and (*b*) that between social and unsocial conduct. Ethical value implies the development of a rational or ideal and a social self. (4) Such a consciousness, in which choices and the agent of choice mutually determine each other, is one in which values are objective. It implies a moral order that is rational and social.

On its affective or emotional side, it has been held (1) that affective tone and ethical value are identical, (2) that there is a peculiar emotional tang or flavor which characterizes the ethical — sympathy, resentment, instinctive revulsion against what is 'low' and coarse, 'the feeling of ought,' etc., and (3) that there is nothing distinctive about the emotional or affective element in the ethical consciousness. Against the first view Tufts cites the objection of Plato and Aristotle that not pleasure but pleasure in right objects is ethical. The second or moral sentiment view has more to support it. For the higher-lower distinction there is probably some emotional basis in shame, disgust and contempt, while the social-egoistic distinction gets emotional color from sympathy and pity as these are fostered by sex feeling, parental feeling and sympathetic resentment. The feeling of ought or respect, and its opposite, moral enthusiasm or love for goodness, are more definitely related to ethical value, because they belong to the attitude in which something is presented as standard of action instead of being the outgrowth of one's own interests.

The paper goes on to mention four lines along which ethical values develop. (1) By rationalizing and socializing the elemental needs for food, shelter, and whatever maintains the life-process; (2) by the reflection of the individual upon group or class valuation; (3) from combinations of group or class valuation with emotional or utilitarian elements expressed in such terms as 'honor,' 'honestum' and the Greek 'kalokagathia'; and (4) by the emotional and instinctive recoil of the individual from certain acts whereby such conceptions arise as 'foul,' 'nasty,' and in part, 'impurity.'

Throughout this compact paper the fact is recognized that ethical values are rather demanded than constitutive of the world. They are neither given to nor anticipated by judgment. It is essential to them that they are simply and always demanded. And yet there are varieties of value in this field which are not always sufficiently emphasized. Take the distinction between the right (as distinct from the wrong), duty and the good, and the values represented by such heuristic principles as the moral maxim of Kant, the conception of the autonomy of the will, and that of a rational universe of conduct. We do not always appeal to these principles. Ordinarily, a conventional code, or other accepted standard, is applied. But when discrepancies arise between the various elements which compose such standards, it becomes necessary to revise and reconstruct them by reflection, and in such situations we resort to principles like these for guidance. A settled basis of organized habits is a presupposition of morality. Our

accepted, conventional standards of judgment are the formulations for these habitual points of view. But it is also essential to the moral life that it be in continual process of melioration to meet the ever-changing conditions of social life. The reflections through which this melioration takes place are under the control of an objective moral order founded upon such ideas of a moral democracy, the autonomy of the real will, or the maxim of the universality of ethical values.

In Coe's brief and very interesting paper on Religious Value, its double character is emphasized, namely, "its immanence in and partial identity with all values, and its transcendence of them as their ideal unity and consummation." "This double character gives rise to two opposed notions of religious value, one of which represents it as merely transcendent of other values, the other as merely immanent in them." On the one hand religion is said to deal with the spiritual rather than the material or sensuous goods; or with eternal rather than with temporal goods; or with reality as distinguished from phenomena, or with unity as distinguished from multiplicity." On the other hand, there is a tendency to identify religion with the esthetic, or ethical, or intellectual life. The paper concludes that "any kind of value may be a religious value, but only on condition of a certain inner self-transcendence whereby the particular value demands complete organization of itself with other values and ideally complete realization of the unitary whole." This implies the 'conservation of values' but only through the conservation of personalities. It implies also completeness of social value in an "ideal social being who satisfies, on the one hand, our desire to be completely understood, and on the other hand, our impulse to give ourselves in utter devotion to an object completely worthy of such ethical love." Religious value "is ethical value itself in its ideal completion and in union with all other values similarly ideal and complete." The sphere of religious value is social life and it differs from ethical value in that ethics of itself "takes into purview only a part of the social ideal that religion accepts."

All this seems to the present writer very near the truth. But religious value is neither identical with other values, nor is it merely more of the same kind as either or all of these. It is neither constitutive nor demanded of the world. Religious value is purposive without being deliberately so, and in this sense it is true that religion means the conservation of all values, as Höffding says. Esthetic and economic values are also purposive, but while esthetics represents the purposive aspect of the constituted and objective world, and economics that of the world of production and exchange, where values are de-

manded and imperative, religion has to do primarily with the purposive aspect of the entire life of purpose and conation. Attempts to identify religion with ethics or metaphysics or economics or social service leave the essentially religious demands of human nature unsatisfied and unexpressed. Ethical, esthetic and metaphysical elements are present in nearly all the conventional forms of religious worship, but they are not essential to it. One may be dissatisfied with all these, as for example in adolescent doubts, and yet be profoundly religious. He who doubts goes out like Abraham not knowing whither he goes, but he seeks a city which hath foundations whose builder and maker is God. He seeks that absolute uniqueness, perfection and individuality which are perhaps our most comprehensive experiences of value.

In a paper on 'Types of Consistency'[1] the present writer maintained that there are two types of value distinguished as habit is distinguished from accommodation. There is an organized and familiar type of values, made up of our established classifications and descriptions, which controls our judgments and also our attitudes and conduct under ordinary conditions. In dealing with new data we proceed deductively by first classifying the novelty and then proceeding to predicate of it all that is characteristic of the class. But when our 'established' classifications prove unsatisfactory and new data compel us to revise the fundamental conceptions upon which we have heretofore proceeded, whether it be in the realms of truth, beauty or goodness, we fall back upon a type of values which seems to grow right out of the nature of reflective activity. We lay aside for the time the technique which we have been accustomed to and proceed speculatively under the rubrics of wide-reaching heuristic principles until our technique has been reorganized.

Again, in different places we have tried to classify values into three groups, the constitutive, the imperative and the purposive, within each of which the two types of value spoken of above appear. For the content of each group it is certainly wise to adopt, so far as possible, a genetic classification. There is more than a mere analogy between the growth of the central nervous system and that of the mind. Secondary brain-centers overlie the primary and function as inhibiting and controlling influences in the life of the nervous system as a whole. Similarly, reflection overlies the simpler and more direct processes of immediate experience, its function being that of analyzing, reorganizing and so controlling immediate experience. There is such a thing as the experience of experience, and it does not characterize

[1] *Journal of Phil., Psych., and Sc. M.*, III., p. 457.

the lives of children and lower animals as it does adult human beings. It develops out of immediate experience and derives all of its materials from immediate experience. As it develops out of immediate experience the latter seems to unfold and differentiate into worlds of values which, in the observation of Lotze, are too widely separated in our modern life.

But how many? Values seem to be grouped already in both popular thought and scientific usage into three main systems which we might call the presentative, the motor and the purposive; and the adoption of some such tri-partite classification will consequently facilitate further work. But these distinctions of presentation, movement and purpose are characteristic of immediate experience as the psychologist analyzes it, and when immediate experience becomes reflective each of these characters becomes a tri-partite system, for reflection too is presentative, motor and purposive. Further reflection seems to indicate that the somewhat Kantian terms constitutive, imperative and purposive are more descriptive of the values within each group. The constitutive group will then include on the habitual side continuity or system, discreteness or exactness, and totality or thoroughness; and on the reconstructive side, such principles as identity, conditionedness or ground or sufficient reason, and conservation. The imperative group includes, on the habitual side, the right (as opposed to the morally wrong), duty, and the good; and on the reconstructive side, such principles as the moral maxim of Kant, the conception of the autonomy of the will, and that of a moral democracy or rational universe of conduct where real freedom is the possession and the characteristic of all. The purposive group of values will include, on the habitual side, art with its famous examples and conventionalized taste, economic institutions with their familiar and vastly significant laws, and individuality with its more or less conventional characteristics; and on the reconstructive side, esthetic taste pure and simple, the law of utility or want and its satisfaction, and absolute uniqueness or completeness.

Values seem to fall easily and naturally into some such system of groups and, while the names may be changed, some such classification seems to be comprehensive and desirable.

PSYCHOLOGICAL LITERATURE.

URBAN'S VALUATION.

Valuation: its Nature and Laws. WILBUR MARSHALL URBAN. London, Swan Sonnenschein & Co., 1909. Pp. xi + 433.

The problem of value, the author of this book tells us, has two sides: a descriptive side which is concerned with the experiences of value as facts, and an appreciative side which is concerned with the evaluation of these experiences. The factual aspect calls into play a psychological interpretation of the phenomena; the appreciative aspect involves the 'axiological problem and method'— a problem and method which are connected with the grounding of values, that is, with their reflective evaluation. The relation of these two features of valuation — the relation of the psychological and the axiological problems — is considered in the introduction, and the conclusion to which the author's discussion leads is expressed in two aphorisms: 'no description without appreciation;' 'no appreciation without description.' The position thus indicated rests, in part, upon the rejection of that species of psychology of which Titchener's recent *Text Book of Psychology* may be taken as an example, and the acceptance of a functional view of the science. The method of functional psychology is said to be presuppositional — a method which 'begins with the analysis of presupposition' of the worth attitude (p. 14); and when the references of this attitude find their interpretation in a psychical continuity, and do not have to depend for this upon physiological dispositions, the method is said to become genetic. According to the genetic method "the progressive differentiation and correlation of the content of consciousness, by which new meanings are acquired and appreciatively distinguished, must be referred for explanation to functional readjustments of consciousness as an organic whole. Different levels of meaning are thus distinguished and transitions from one level to another accounted for" (p. 15). The references which the worth attitude makes — the meanings acquired in experiences of value — are of two kinds: they are either transgredient when the value refers a present feeling beyond the present state, or immanental when the value refers 'to something more deeply implicit in the present state' (p. 9). These distinctions play an important part throughout the book.

The genetic view of science implies a reading of phenomena in their total context. To lose contact with the environment is to make the genetic task impossible. Hence the 'worth experience is always an attitude,' that is, 'an immediate experience which contains in it a reference — in our terms, either transgredient or immanental — to presupposed psychical processes' (p. 14). Further consideration of this experience (Chapter II.) shows it to be a 'funded meaning (*i. e.*, a meaning acquired in the process of valuation) of the object for the subject in different attitudes, or as predetermined by different dispositions and interests' (p. 26). This statement implies two classes of inquiries: that which concerns the attitudes of the subject, and that which concerns the objects of these attitudes. These also are fundamental, and we give the author's conclusions. There are, he says, three fundamental attitudes of the subject: "(1) simple appreciation of the affective-volitional meaning of an object for the self; (2) the personal attitude, in which the worth of the object is determined by explicit reference of the object, whether a physical possession or a psychical disposition, to the self or alter, and in which characterization of (*i. e.*, the reference of value or worth to) the self or alter is presupposed, and (3) the impersonal attitude, in which the subject of the judgment is identified with an impersonal over-individual (*i. e.*, social) subject, and the value of the subject is determined by explicit reference to an over-individual demand" (p. 28). Objects of value are classified as follows: (1) objects of simple appreciation; frequently the author refers to these as 'condition worths,' that is, worths or values which have their basis in some modification of the condition of the organism; (2) objects of personal worth founded in the process of characterization of the person (self or alter); (3) objects of over-individual worth constructed in the processes of social participation (p. 30). If, in view of these distinctions, we ask what is the nature of the consciousness of value, we are told they are 'tertiary qualities' of an object, that is, funded (accumulated or stored) meanings predetermined by antecedent psychical processes, or, in brief, they are affective-volitional meanings. This view is defended against a narrower interpretation, and the 'feeling of value' is said to be "the feeling aspect of conative process, as distinguished from the feeling-tone of simple presentations. And by conative process we understand the total process of development by which affective-volitional meaning is acquired, the total process including actual (*i. e.*, affective) and dispositional (*i. e.*, conative) moments" (p. 54).

What now are the presuppositions of the worth experience? This

is, of course, the axiological problem as it relates to the consciousness of value. When we ask this question we are concerned with the cognitive implications of experiences of value. The author argues, correctly I think, that these are always some form or other of reality; value-feelings are characterized by the 'cognitive acts or attitudes which relate the object to the subject' (p. 41), and are not distinguished merely by the the objects of the feelings or by the causes of the feelings. Here the author follows Meinong, but parts company with him when this writer asserts that the presuppositions of value-feelings always imply judgments of existence and non-existence. Urban extends the references of value experience, in its cognitive aspects, to include, besides such judgments, what are called presumptions and assumptions of reality. Presumption is the acceptance or rejection of some reality meaning, and the condition which determines it is that it shall have 'recognitive meaning for a conative tendency' (p. 52). Assumption in its prejudgmental form is the acceptance of a subjective demand after arrest of primitive presumption, or taking an object as existent when there is a possibility of its non-existence. Here we have to do with what are called 'feelings of imagination.' Postjudgmental assumption implies dispositions created by acts of judgments, as, for example, values which attach to the general concepts, such as good, truth, virtue, etc. These are called 'feeling abstracts' or 'affective signs.' With judgment of reality there is acknowledgment or disavowal of certain control factors. Thus 'from primitive presumption arises, through arrest, assumption, which in turn passes into judgment and the later assumption' (p. 49).

In Chapter III. the modes of the consciousness of value are considered from the qualitative and quantitative points of view. From the qualitative standpoint, all worth experience has two modal characteristics — direction and reference. By direction is meant 'that fundamental duality of quality which, when feeling is viewed retrospectively as passive and as abstracted from conation, is described as pleasantness-unpleasantness' (p. 59). The presupposition of pleasantness and unpleasantness is an attitude of conation: they themselves are, however, feeling tones of presentational experience. In the realm of values they have no place; here we must speak of positive and negative direction. By reference is meant those 'aspects of feeling which refer to something presupposed, to a disposition already acquired for which the object has a meaning.' Transgredient reference is the sense of a subjective control leading on to other states (p. 60). Its dimensions, so to speak, are tension — restlessness — contraction (p.

67). Immanental reference is 'a sense of a more objective control leading to continuance or repose in some state' (p. 60). Its dimensions are relaxation — repose — expansion (p. 67). From these fundamental modes other meanings are acquired. First the primary acquired meaning of simple apprehension, that is, the appreciation of the affective-volitional meaning or worth of an object 'prior to explicit reference of the object to the ego or the alter or to other objects' (p. 68). At this level appear the 'impellant mode — feeling of obligation' (p. 68 f.), and the 'semblant mode — æsthetic feeling' (p. 70 f.). Besides these primary acquired, there are secondary acquired meanings, namely, acquired meanings of characterization, in which the reference of worth is to the personality (ego or alter); and acquired meanings of participation, in which similar desires and feelings in the minds of others are presupposed, giving rise to judgments and assumptions of over-individual (*i. e.*, social) demands (p. 71 f.). Quantitatively considered the consciousness of value must be studied with reference to its breadth or depth (p. 72 f.).

The next three chapters are of the nature of an interruption. This the author acknowledges (p. x) of Chapters IV. and V., in which the general psychology of the feeling experience is worked over systematically. I do not find, however, any reference to the *status* of Chapter VI., which arrests the argument for the purpose of studying and estimating the contribution of economics to the general theory of value. Why preferential consideration should be given to this one of the sources (pp. 3–6) of the author's theory of value as a means of determining the laws of valuation which apply to the entire range of worth experience, without giving the same kind and amount of attention to the other, does not seem, as a matter of method, to be sufficiently justified. Earlier statements (pp. 3 f.) foreshadow this preferential selection of economics. The usefulness of economics for the author's purpose consists in the fact that "there already exist certain formulations of such laws (of value), formulated for the specific purpose of economics," and "since these formulations *have been made*, although upon an inadequate knowledge of worth experience, and, therefore, have a definite place in worth theory, a critical examination of their foundations and the extent of their application constitutes our first problem" (pp. 142–143). If the selection of method is to rest upon this basis, why may we not go to, say, jurisprudence for our starting point, or to any other science which, as a matter of fact, has reached the formulary stage — ethics, æsthetics or religion? Because economics deals with a class of worth objects which is capable of more rigid and

fixed formulation, it presents certain advantages in the preliminary stages of the inquiry. But also for this very reason must one be on his guard against narrowing all worth experiences to the limits of this one. One must, even in the study of the typical formulations with which he begins, include material furnished by other types of valuation, if he is to avoid the fallacy of inconsequence. The question, therefore, I wish to raise is whether there is sufficient justification for basing the general laws of value on a special study of the laws of economic value, and whether, as a matter of method, it would not have been advisable to proceed immediately, without the intervention of Chapter VI., to the discussion of the different levels and degrees of value experience (Chapters VII. to XII.), and, thus, empirically to have developed and refined the laws of value through the deepening insight into the processes of valuation which cannot fail to come when the genetic method is applied to these value experiences. We should then be saved the appearance of having determined the laws before the phenomena had been subjected to critical analysis and estimation. Urban surely did not come to his formulation of the general laws of value in the way he seeks to lead the readers of his book; and there is one among his readers who has a temperamental preference for going over the original trail.

The problem of Chapter VI. is 'to examine the psychological laws of feeling and its modifications, developed for the purposes of economics, and to determine the extent of their application to other types and objects of valuation' (p. 144). These laws are 'laws of relativity of worth feeling' (p. 145), and are said to be three in number. There is (1) the law of the Threshold (pp. 146–155); (2) the law of Diminishing (or Limiting, cf. p. 158) Value (pp. 156–172); and (3) the law of Complementary Values (pp. 173–181). The law of the Threshold is "an expression of the fact that the power of an object to call out the feeling of worth, or the feeling of worth difference, depends not upon the object alone, but upon the feeling or conative dispositions of the subject as well . . . the question relates to the least quantity of an object which will produce a modification in the feeling of worth" (p. 146). The scope of the law is said to lie within an upper limit known as the 'existence minimum,' and which is a 'conceptual point at which absolute value passes over into relative value' (p. 148); value, in other words, becomes intrinsic (p. 150); and a lower limit which is the 'conceptual point at which the minimum of worth tends to pass over into worthlessness,' and here we have the 'final or marginal utility' (pp. 149, 169, 170). The law of Diminishing or Limiting

Value embodies "the conception that the satisfaction of desire or pleasure, when it is increased quantitatively, finally results in the loss of capacity of that desire (and with it the feeling) — and, therefore, in the movement of desire to new objects, and the formation of new dispositions" (p. 158). In this connection are discussed the more general laws of the dulling of sensitivity and of satiety (pp. 158–167), and the relations of the laws of value to these laws are considered. The law of the dulling of sensitivity, it is shown, is limited to sense feelings and what are called the redundancies of the feelings of value, while the law of satiety finds no application at all in the field of values. The general character of the law of Complementary Values consists in the fact that "the elements of a total group of objects or part-processes of a total conative process of consumption or acquisition, are so related to each other as to be *complementary*. In other words, when related to each other as elements in an individual whole, the value of the whole, the degree of satisfaction of the conative tendency presupposed, exceeds the value of the sum of the elements taken separately. The values in such processes are described as Complementary Values, and the objects toward which these feelings are directed are ideal objects" (p. 174). Psychologically interpreted this law is a form of the general law of conative continuity (p. 178). The acquired value of such a process "has as its object not the element, but a new object founded on the rearrangements of the elements" (p. 178), that is, they are 'founded objects,' and founded objects are now defined as 'form-qualities' appearing in a conative process. Three psychological laws of complementary values are pointed out and considered (pp. 179–181), in all of which the rearrangement of elements creates form-qualities which are the real objects of imputed or complementary value. They are (1) the law of contrast, according to which "an object of desire and feeling when contrasted with its opposite, or when its existence is contrasted with its non-existence, gets an imputed value which, by itself, it has not intrinsically or instrumentally" (p. 180); (2) the law of the total series, which states that "the ordering of objects of desire and feeling in graded series, or with certain relations of contrast and repetition, as for instance in rhythm, gives rise to an imputed value of the whole which is not a sum of the value of the separate elements" (pp. 180, 181); and (3) the law of the end feelings, which recognizes that "the worth of a series of elements is determined by the final moment of the series and its relation to the preceding moments" (p. 181). The significance of the whole discussion of the chapter, in the words of the author, "is to

be found in the fact that the psychological analysis of the different types of worth feelings, and the formulation of the laws of valuation based upon this analysis, give us the scientific concepts with which to interpret the concrete facts of valuation which our analysis will disclose" (p. 189).

I have sought to center attention on the first few chapters (I.–VI.) of this book because they form the basis not alone of the positions to which the author comes in his study of the several main types of value, but also because they are the foundation on which the author seeks to rest the new science of axiology. The next main section is given to a consideration of the different worth objects both in themselves and in their relations to one another (Chapters VII.–XII.). Values of simple appreciation (Chapter VII.), it is shown, are pre-axiological, in somewhat the same way as sense objects, in Baldwin's discussion, are pre-logical. They are sub-personal and sub-social feelings. They may, however, acquire implications of a quasi-ethical and quasi-æsthetical sort, and it is this fact that makes them the starting point of a movement in which the higher personal and over-individual values are acquired. The consideration of value-movements — movements in which new meanings are acquired — psychologically depends upon *Einfühlung*, a term which the author uses 'to designate the entire process (projection, imitation and ejection) involved in the activities of characterization and participation' (p. 235 and note), and in this usage it includes value-movements of simple appreciation as well (pp. 194–202). The problems connected with the personal and over-individual values are determined by this relation which *Einfühlung* has to all value objects (Chapter VIII.). The axiological aspect of these higher types of value are considered in Chapters IX. and XI., and Chapters X. and XII. apply to these values the general laws of value which were determined in the earlier part of the book. Chapter XIII. discusses certain synthetic problems, and Chapter XIV. is occupied with a statement of the bearings of the conclusions of the analytical section upon the axiological problem.

This work has wider interest for philosophy than that of its special subject. It touches directly or indirectly problems in current discussion, and forces to the front some that have not attracted much attention in recent times. As an example of the former, we may refer to the section on pragmatism (pp. 396 f.); and of the latter, the author's formulation of the axiological problem. There is one thing of which the author seems to be in no doubt with respect to his distinctive problem: namely, its unequivocal uniqueness. This

means also its undeniable modernness. Helps to get itself stated or to answer its questions, it not only cannot get but does not need from the ancient disciplines. Philosophy (metaphysics) and ethics are useless for assigned reasons (pp. 3 f.), and epistemology is quite 'too narrow' to include the axiological problem. Axiology is said to be the outcome, not of these, but of the evolution hypothesis and the struggle for existence, on the one hand, and the modern consciousness of the social problem on the other. From them has resulted, we are told, the consciousness of 'a new side of reality' (p. 2) — the world of values. And it is this world of values that the author, untrammeled with any overweighted reverence for historic names, has studied in these pages. His disregard of the past — I might almost have said unconsciousness were it not for a few incidental references and an effective and somewhat heavy draft upon Leibniz (pp. 395–428) — is delightfully irritating, and is sure to make some of our modern philosophers who know nothing but the past rub their eyes and wonder. Others, however, will be set to thinking, and, as a result, we shall perhaps be inquiring a little more carefully than has been our custom into the nature of philosophical problems and of the relations in which these stand to the genetic movement itself.

There are a number of psychological questions suggested by the reading of the book. The author has read discriminatingly the modern writers in this field, and he has made special use of the Austrian school. In his handling of psychological problems there is an irenic spirit which is distinctly promising. Yet, I think, one will question whether the Wundtian psychology of feeling which the author accepts (pp. 62 f.) has been successfully correlated with the functional view of consciousness, in his exposition of which the author comes so near to Stout. I presume we are involved at this point in the whole question of the nature of psychology, and especially whether the structural and functional views have any points of contact, or are capable of any sort of reconciliation (p. 63, note). Another question is the relation of hedonic intensity to increase in depth and breadth of value feelings. In the author's treatment, value feelings move in a positive and negative direction, and are said to vary independently of the hedonic accompaniments of the value experience, so much so indeed, that the psychology of valuation informs us of an intensity-less appreciation (pp. 106 f., 128 f.). It could be wished that a fuller exposition had been given to what is the precise nature of 'direction' as distinguished from 'intensity,' because it seems that it is the lack of distinctive characteristics here that leaves one in doubt as to the relations that direc-

tion bears to intensity. The broader question which includes this one is, perhaps, that which relates to the distinctive features of the various affective experiences which, commonly, we mark off by such words as feeling, emotion, sentiment, passion, etc.

Again, there is the problem of *Einfühlung*, which, in the words of the author, 'cannot be said to have reached a final solution' (p. 237). Of the fact for which the term stands there is, of course, no doubt. We do read into — or *feel into* — other objects experiences of which we have knowledge through our own immediate consciousness. The questions which psychology will be interested in concern the extent of this process, the nature of it, and the method of it. The author takes *Einfühlung* in a much broader way than has been customary (p. 235, note), to cover not only the processes lying at the foundation of the æsthetic experience, those, namely, to which Baldwin confines the term and which he calls sembling, but also those which are at the foundation of the ethical and moral life as well, those, namely, which the author has summed up under the terms characterization and participation. There is, doubtless, need of a distinctive term to cover the characteristic processes of the whole field of values in its psychological features, and if psychologists and others can agree upon the usage here indicated it will advance matters so far. But, fundamentally, there is the question of whether a common denominator can be found for these various experiences. In other words, it is a question of the extent of the process of *Einfühlung*. But the determination of the extent of the process must necessarily throw into the foreground the problem of its nature. Here the author's discussion of the relation of feeling and will to value feelings (Chapters IV. and V.) has a direct bearing (cf. especially pp. 83–95), and the reviewer thinks, with the author, that feelings of value must be considered as involving a two-fold functional relation within the total value experience, and that, consequently, they cannot be described as either feeling or conation, but only as affective-volitional or volitional-affective, depending upon which function is uppermost in the experience under consideration. Now, of course, the method of the establishment of such values is involved in the psychology of *Einfühlung*, and the psychological question becomes at this point, How is *Einfühlung* possible? (pp. 236–253). But all these psychological questions centering in the psychology of *Einfühlung*, rest back upon a more fundamental and distinctive problem — the problem of consciousness itself. The discussions of the past few years have done something not only in the way of centralizing this problem for the psychologist, but also of suggest-

ing possible lines of profitable inquiry. There still remains work to be done from the genetic standpoint, and although the present book has made some advances over previous writers, there are some questions which the author's discussions leave open. Urban does not take the social character of consciousness in a thoroughgoing way; and, therefore, when he raises the question, How is *Einfühlung* possible? he conceives its possibility as a means of bridging the gap between one individual and another. This is seen throughout his discussion of 'personal values,' which are individual values; and it does not suggest itself to him that the existence of such values is itself a problem of which axiology ought, if it is genetic, to give some account. If this prior question were considered, it might lead to a limiting of the scope of *Einfühlung*, and the position would approach nearer that of Baldwin and others.

The index gives but two references to religious values. According to the author religious construction, like the æsthetic, is concerned with the projection of social worth into ideal personalities; but the demand that religion makes for a completely over-individual object is, from the point of view of valuation, not borne out. All that can be allowed is that 'the personal and the impersonal values fuse in an intrinsic value' which, as immediate, is over-personal and over-social in its meaning. "But still it remains a personal value in the sense that it is only as a *practical* absolute, as the limit of a series of personal experiences, that it has axiological meaning and validity" (p. 348). It is to be hoped that the author will consider, at some future time, this class of values in the same patient and exhaustive way that is so characteristic a feature of his work.

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EMOTIONAL THOUGHT.

Psychologie des emotionalen Denkens. HEINRICH MAIER. Tübingen, Mohr (Paul Siebeck), 1908. Pp. ii + 804.

One scarcely knows what to say of this really immense book of over 800 large and rather closely printed pages. The novelty of the problem, as well as its timeliness and importance, would tempt one to say that too much could not be written under this title, and yet the conclusion is hardly to be avoided that the book would have gained greatly by condensation. Surely everything ever thought or written, bearing even remotely upon the subject, has found its way into these pages (proof conclusive of long years of conscientious and labori-

ous work, but also, if one may say it without impertinence, of a temperamental inability to remove the smallest piece of scaffolding) — with the result that it is difficult to see the lines of the building, and with the further result, it is to be feared, that the author has condemned his own book to the limited audience of the most courageous.

But when these really serious criticisms are made — and they are made with all the greater reluctance because of the significance of the subject — the book may still be welcomed as the first attempt at a systematic presentation of a range of ideas which have as yet been more or less in a state of flux. "In the center of the discussion," he tells us, "is the thought that out of the emotional and practical side of the mind, out of the life of feeling and will, there develops a type of thinking which is effective in the ideal constructions of the affective imagination, in the world of purposes, norms, values and goods, and which appears most notably in æsthetic contemplation, in religious faith, in custom, law and morals." He thinks that he is able to show that "this thought, the elementary activities of which are to be found in the images connected with feeling and desire, takes its place, as a unique, independent, complete and unitary type of logical function, beside the judgmental type which belongs to cognitive thought." For some time such ideas have been in the air, such a logic of the practical reason has been a *desideratum*. Ribot has been striving to establish a logic of emotions; Meinong and his followers have been pointing in this direction with their investigations of the affective imagination and judgment; Baldwin has been preparing the way for such a logic in the first two volumes of his *Genetic Logic*. With all these Maier's work has affiliations, and with the first two relations of acknowledged dependence. His own special contribution consists in showing (in an exasperatingly detailed fashion to be sure, and yet in a way which well supplements the work of the others), that the entire 'categorical apparatus' of objectification is present in the affective and volitional processes, and that there is a conceptual interpretation of this objectified experience in value judgments, entirely analogous to the truth judgments of 'cognitive thought.'

The task thus contemplated is, as the title of the book indicates, in the first place psychological. And yet the inclusion of emotional thought (the author's general term for two sub-forms, *affective* and *volitive* thought) under a larger concept of logic, as well as the carrying out of the program outlined above, involves constant reference to logic and, indeed, the traversing of the whole field of logical lore. Here the professional logician will find the author entirely at home,

and will, moreover, I venture to think, find much that is fresh and of value from his own point of view — especially in the matter of the psychology and logic of speech, which plays such an important role in his discussion. It is true that the claim that these elementary activities of emotional thought are to be found in affective and conative images requires him to break completely with the fundamental assumption of modern logic, that the judgment is the fundamental logical function. But this is by no means entirely novel. The arguments by virtue of which he holds that the essence of even the most elementary cognitive judgment is the claim to truth; that truth always involves equivalence of a special type, equivalence of two ideal elements being present in the most primitive judgment; and that, finally, even the judgment of the existential type is not the most ultimate logical function — these have long been familiar in various forms, and to many conclusive. With this reconstruction of current logical conceptions, he is in a position to maintain that the claim to objectivity is present in the simplest processes of feeling and will, and that within the processes of presentation and imagination, as determined by desire, emotion and will, are fundamental acts of thought (Denkakte) which, while claiming neither existence nor truth, establish an objectivity of values in ethical, æsthetic and religious experience. These fundamental acts constitute the presuppositions (the presumptions and assumptions, so to speak) on the basis of which the more complex emotional logic of these spheres develops. The entire 'categorical apparatus' of objectification is, to use his own terms, pre-logical in the sense that it is prior to judgment.

It is not possible here even to suggest the way in which this program is carried out through over half the book. It may, however, be said that the completeness of the application of the purely analytical method which the author employs makes it admirably complementary to Baldwin's genetic proof of the same general conception. Nor can we delay to point out the interesting conclusions he draws with respect to the objectivity of æsthetic and religious experience. Turning directly to the more complex and developed types of emotional thought, we find that they are such forms of affective and volitive thought as arise when, on the basis of the fundamental acts of feeling and will, judgments of equivalence and of conceptual interpretation develop. Chief among these are the *value judgments* embodied in art and religion, in morality and law.

Maier devotes a special chapter to an abstract discussion of value judgments. Conformable with his doctrine that the elementary logical functions are not judgments, but *Substratdenkakte*, the value judg-

ment is, he holds, not primary, but derived. There is, it is true, a broader and a narrower use of the term value judgment. In a sense, in *all* feelings the objects corresponding to the affective images are implicitly valued; and to this extent valuation is presupposed in the elementary *Denkakte* of religious, æsthetic and ethical experience. But in the strict sense of the word, value judgments are concerned with values as they are explicitly thought; value judgments establish a conceptual relation between feeling and its object, and are therefore judgments of knowledge in the proper sense of that term. The writer of these paragraphs would gladly linger over the details of this discussion, especially the contribution to the reconciliation of the affective and voluntaristic theories of value, the treatment of this point, as well as of the general psychological question of the relation of feeling and will, being one of the best that have appeared. It must suffice, however, to suggest the important bearing of this definition of values upon the further development of the book. While the primitive acts of moral will, of religious faith, and of æsthetic intuition, have objectivity and emotional and volitive evidence, it is only the reflective value judgments that have elements of knowledge.

The division of emotional thinking into 'affective' and 'volitive,' according as the *Substratdenkakte* are embedded in feeling or desire, affords the basis for the main divisions of the work. Affective thought included the æsthetic and religious. Under the head of volitive thinking, the second main division, Maier discusses legal norms and principles and ethical thinking proper. These constitute the most highly developed forms of volitive thought, developed by judgments of equivalence and interpretation from the elementary volitive acts, desires, commands, requests, etc.

His analysis of the processes of abstraction by means of which the social and legal norms are developed, is one of the most suggestive parts of the entire work, and constitutes a real contribution to the reconstruction of the Philosophy of Right which is taking place under the influence of the psychological analysis of valuation. These norms, he is led to believe, are wholly hypothetical and derived. An examination of the nature of the subject of rights, of the ends which these norms as hypothetical imperatives serve, leads to a purely relativistic and positivistic conception of the most fundamental concepts of right (p. 740). In ethical thought proper, on the contrary, he believes we are led to deeper forms of volitive thinking in which there are absolute ends and values. A critical examination of various ethical theories, as well as an analysis of the ethical facts themselves,

brings him to a form of Eudæmonism based upon a necessary intuitionist assumption. Ethical desires stand in the closest relation to the instinct of self-preservation, the fundamental volitive *Denkakt* being what he describes as *Ichwille*, an absolute element without which the characteristics of ethical thought are inexplicable. Out of this element, through processes of volitive abstraction, develops the *Persönlichkeitswille*, and the entire system of ends and norms which it embraces. While much of the content of the ideal personality is recognized as social, Maier's ethics has a decidedly individualistic tone.

Enough has been said to indicate the main tendency of the book, as well as the points at which suggestive elements are to be found. In the main it is psychological and positivistic in character, with an underlying voluntarism which finds expression in the main conception that in the most elementary processes of desire and feeling there are fundamental acts of objectifying thought, out of which develop the more complex types of ethical, æsthetic, religious and legal thought. The chief epistemological or axiological conclusions are negative rather than positive. In none of these spheres, the author holds, is the evidence cognitive and the value a truth or existence value. Throughout the various chapters there are scattered discussions of these various kinds of evidence and validity, but one misses sadly a concluding chapter in which these threads might be drawn together in a general discussion of the relation of value to fact and truth. For this one would gladly sacrifice much of the tedious historical discussion, for with the best will in the world it is but an obscure pattern that one gets by piecing together paragraphs scattered here and there. But despite these defects of construction, the book may be safely recommended as a source from which many elements for the future development of this fascinating subject will inevitably be taken.

W. M. U.

HUMAN VALUES.

I Valori Umani. F. Orestano. Turin, Bocca, 1907. Pp. viii + 300.

This recent issue of the Bocca Library of Modern Science fully sustains the traditions of a series which has already attracted attention by its publication of translations of Nietzsche's works and of other books of a more scientific character but equally modern tendency, such as those of Harnack, James and Verworn. In addition to its intrinsic interest, it has the further merit of being the first attempt in Italy to establish that specific field of investigation which alone meets in a

scientific fashion, and therefore in a manner likely to do justice to its problem, interests which have become dominant in the modern mind. In introducing the theory of value to Italian readers, Orestano is not unmindful of his unique opportunity, and in his Introduction he traces the historical stages by which the problem of values and evaluation has appeared in the precise and dominating form in which it presents itself to-day. The relation of his own book to the general movement being what it is, he has not hesitated to make it in large part a presentation and criticism of those works, mainly German (of Meinong, Ehrenfels, Lipps, Krüger, Eisler, Höffding, and Cohen) by which the movement is represented. The original element in his contribution is the skillful manner in which he makes this criticism contributory to such an exact definition of the fundamental concepts of value as will, it is hoped, make the theory fundamental for the ethical and social sciences.

The aim of the book determines its form. The question, to what extent we have the definiteness of material and precision of concepts necessary for a general theory of value, is followed by the second more specific question of the possibility of founding a science of ethics on this basis. Accordingly, the work falls into two main divisions, the first consisting of a critical study of the chief theories and conceptions, ending in his own definition and classification of values; the second being devoted to a similar study of the chief theories of ethical values, concluding with his own views on the subject.

Orestano's general point of view is definitely scientific and positivistic rather than philosophical and systematic. Have we in the concept of value a formula comprehensive and definite enough to enable us to resume all the phenomena of social and moral experience in a manner similar to the employment of the concept of force in physical science? It is this idea that directs his critical studies; and his answer is affirmative — that is, in case we define value properly. From this point of view, it is true, he finds the purely psychological definitions insufficient. To define value in terms of feeling or desire or *Einfühlung*, is to define it too narrowly, in terms of a single element. The fault of these definitions is not, however, that they are psychological, but that they are *wholly* so. He does not react from the psychological point of view and find the criteria in logical or ontological definitions. He seeks instead a concept that, in the philosophical slang of the present, has 'thickness' rather than 'thinness,' that has contacts with all the sciences of vital phenomena. The problem is to find a concept that is fundamental to all these psychological vari-

ables. This *desideratum* he discovers in the concept of *interest*, *i. e.*, interest in the genetic, bio-psychological sense. "Value is the consciousness of interest in so far as it is connected with the object by which it is produced." The consciousness of interest is, to be sure, in the first place a psychological and subjective state, but it expresses the dispositions, actual or latent, both of mind and of body, of the individual and the race. Value is a vital phenomenon appearing under a psychological form.

The classification of values under the general concept of interest is not the least suggestive and well worked-out part of this section. Economic value is interest called out by the conservation of life; intellectual value, interest experienced by the subject for his cognitive activities as such; æsthetic value, interest not associated with an actual practical end; religious value, the interest we have in an ideal order perpetuating the fundamental values of life. Finally, moral value is determined by "the relation of a particular object in which one is interested with the fundamental concept, implicit or explicit, that one has formed of *life*, in the totality of the ends which it embraces" (p. 288).

Thus the moral values correspond to a unique interest and have a unique place in the system of values. They are concerned with valuations of a higher order, or rather with evaluations of the other values. The preceding definition follows upon a criticism of the various attempts to define moral values, in which the difficulty throughout is found in the tendency to identify ethical values with single concrete ends and interests. For Orestano, on the contrary, they are purely formal and their evidence logical, in the sense that all moral evaluations are deductions from the general concept of life which each has formed for himself. Thus, he holds, we are to explain the varying emphasis of ethical theories upon personality and law, obligation and sanction, etc. A purely functional and regulative conception of morality is the necessary outcome of his conception of valuation as a résumé in the psychical world of the subconscious forces of life.

Orestano maintains this positivistic and formal attitude throughout. For the rest, his position is well indicated by his attitude toward certain of the critical questions of the theory of value. He is, for instance, quite free from the banal prejudice that any psychology of values necessarily involves hedonism. His concept of ethical values takes him beyond the equally banal preoccupation with the alternative of egoism or altruism. On the question of absolute values, his principles lead to negative conclusions, except for his admission of the possibility of

practical absolutes in the sense that there are certain objects of such a nature as to call out a *constant* interest on the part of an individual, and to which he subordinates all others. As to absolute and universal values, in the sense that there are objects capable of calling out constant interest on the part of all men, only experience can decide.

It is in his treatment of the problem of the objectivity of values, perhaps, that he leaves most to be desired. He is confident that the principle of interest solves this question, — takes us beyond subjectivity. There can be no doubt that this definition has much to recommend it. On its psychological side, it does, as indeed others have shown, combine the active and passive sides of feeling and desire, and thus unify the psychological definitions of value. But interest is an unstable concept, and as equivocal as unstable, with one eye on the biological world, as Orestano has shown, and the other — is it not on the ontological world? No less equivocal and unstable is the concept of 'life' as readers of Guyau (by whom the author seems to have been greatly influenced) have long seen. It is only, as the author himself recognizes, in the possibility of passing beyond the biological conception of life, that sense is given to the element of absolute sacrifice in morals. But when we pass beyond the retrospective concepts of biology, in what regions shall our prospecting for the foundations of the ideal be carried on? To this question the book scarcely gives an adequate answer.

W. M. U.

VALUE AXIOMS.

Studien zur Wertaxiomatik. Theodor Lessing. Archiv für systematische Philosophie, 1908, Bd. XIV., 1, 2.

These articles are especially worthy of notice, if for no other reason than that they are an extreme illustration of both the method and the outcome of the anti-psychological tendency in the theory of value. Written avowedly under the direct influence of Husserl's epistemological conceptions, they seek to maintain in the sphere of valuation that same logical purity which has condemned older members of the philosophical family to an unfruitful virginity. As Husserl would define logical laws as purely ideal and in no sense laws of actual thought activity, so Lessing would see in the laws of valuation purely ideal laws unrelated to empirical feeling and will.

The laws of valuation are laws of 'richtige Wertrangierung.' Themselves empty universals, they can never be principles of motivation but merely of measurement and regulation. On the analogy of

pure logic, 'reine Wertlehre' seeks *forms* of value — of differences, summations and contrasts — relations that are universal, and of which it is possible to say *a priori* that to so value, wish, or will, is to value, wish, or will rightly, *überhaupt*. What these empty universals are, Lessing finds some difficulty in formulating abstractly; but in so far as they find expression in empirical valuation, they are those formal principles of preference involved when we estimate objects, (*a*) according to the number or sum of the value-elements; (*b*) according to the order or relation of the elements; (*c*) according to their intensity or strength.

With regard to these formal categories, it is evident, so Lessing holds, that their further specification can lead only to general psychological laws. It is similarly evident that as soon as we leave the sphere of pure forms and pass to actual valuation certain antinomies emerge. An 'ideal worth-consciousness,' one in which the ideal laws worked purely, unaffected by psychological motives, would, it is true, be without worth conflicts; but owing to tendencies of purely empirical origin, we lay the accent now on one of these principles, now on another. As an illustration, we have what he calls the antinomy of 'axiological height and breadth,' between intensity and extensity of values; and one also which appears in the law of Marginal Utility, which is of course, on his view, not a law of valuation at all, strictly speaking. All the historical types of ethical theory, the individualistic and the universalistic or socialistic, the utilitarian and the eudæmonistic — all with any content to them, are the results of accentuation of one or other of these categories, due to historical or psychical tendencies, and are shot through with contradictions. Lessing's chief interest is ethics; and to his mind these antinomies mean the shipwreck of all teleological ethics. The break-down of the Kantian morality, with its logical squint (one eye on the transcendental categories, the other on the sphere of specific empirical content) indicates the immanental Janus-nature of all such ethics.

Lessing does not hesitate to undertake the task of describing the 'ideal conscience,' for the right ordering of empirical ends, in which the categories would work purely. One cannot say that he is successful. It is too complicated to be recognized, still less to be convincing. Somewhat more encouraging is the merely empirical ideal which he allows us, in our weakness, to substitute for the ideal conscience. Laws of valuation are, as we have seen, in no sense constitutive of ends or values. All such empirical content is derived from the *wertfrei* sciences of psychology, anthropology, etc. A 'will to value,'

however defined, is a monstrosity. And yet some concrete end we must have. Here it is: corresponding to the theoretical ideal of "creating logical dispositions the undeceptive character of which we may bring to consciousness at every step" is the "ethical ideal of the practical sphere, to create instinctive natures, dispositions and moral characters, the undeceptiveness of which, in so far as they do the right spontaneously, they make clear at every step."

Any criticism of this curious logical somersault into the crudest psychological intuitionism is here out of place. One may, however, be allowed to suggest that such a union of empty universals and instinctive natures, even if it does away with the reproach of unfruitfulness, is as likely as not to give birth, as in the past, to practical and moral monsters.

W. M. U.

ÆSTHETIC SENTIMENTALISM.

Le nouveau sentimentalisme esthétique. Ch. Lalo. Revue Philosophique, November, 1908, pp. 441–476.

This article contains, first, an exposition of Einfühlung as an æsthetic doctrine and, second, a criticism of it from the intellectualistic standpoint. The 'new sentimentalism' is the revival of the doctrine that 'feeling is the organ of beauty, and the conception of Einfühlung is its central point.' The term *Einfühlung* is untranslatable, but the author gives as paraphrases 'a kind of sympathy,' 'a projection of the self into objects,' 'the objectification of our affective life,' 'the identification of subject and object through the feelings.' Lipps and Volkelt are foremost among its advocates, and Karl Groos, Konrad Lange, Jonas Cohn, Paul Stern, Witasek and Dessoir are also mentioned among its supporters. The author traces the history of the term and of the conception for which it stands. He discusses the relation of Einfühlung to sympathy, to 'interior imitation,' to organic sensation, to association, to symbolism, to affective life, and to intellectual activities; in these discussions his starting point is a doctrine of some supporters of the Einfühlung theory. Needless to say they do not always agree among themselves, but they have this in common that they attempt to make Einfühlung fundamental and to show that other theories are simply subordinate elements in their doctrine.

In his criticism of this doctrine, M. Lalo raises three questions: (1) Has the objectification of affective life a fundamental role in æsthetics? (2) Has the Einfühlung conception a true explanatory value, or is it a confused notion? (3) Does its philosophical significance rest upon acceptable principles?

In other words, what is the æsthetic, the psychological, the philosophical value of this form of the sentimentalism?

With regard to the first, he insists that, though it may be true that there is such an objectification of affective life, it is not an exclusive possession of the æsthetic experience, since perhaps the best examples of it are to be found in the animal forms of pleasure and pain. Moreover, the intensity of the projection is not a measure of the æsthetic value of experience; witness the rustic's experiences in seeing a play. Once more, complete objectification and identification with all that is contained in a drama with its many diverse characters, or in a museum, is quite impossible, but still æsthetic pleasure may be present. Einfühlung is not a notion, he concludes, which is adequate to explain the æsthetic character of the facts.

The second question also he answers in the negative; the conception suggests problems but solves none; its advocates disagree among themselves and the conception itself is confused. It is "internal imitation with no model, a symbol representing nothing but him who thinks it, an exteriorization of our sensibilities which creates within us new sensibilities of which we were incapable without it, a height and depth of affective life which excludes the highest and deepest sensible impulsions," and so on. In short, M. Lalo regards the Einfühlung theory as the eternal 'je ne sais quoi' erected into a principle of explanation. He cites various distinctions made by its advocates which he regards as artificial and charges that the alleged irreducibility of Einfühlung is the pretext for a lazy philosophy, while its "obscurity, a convenient refuge for an art criticism too conscious of its weaknesses, is, for the psychologist, merely a sign of insufficient analysis, and, for the logician, of insufficient explanation."

Its philosophical value is, in his opinion, quite as small. "The philosopher can see in the Einfühlung only a first step towards mysticism, and the rejection of every possibility of rational and scientific explanation." Volkelt's contention for the irreducibility of certain mental factors involved in Einfühlung is the principal object of this criticism.

In the experience described as Einfühlung, states usually subjective are objectified. Ordinarily the objectification of mental states is determined by utilitarian conditions, but in this case it is the technique of an art which brings it about. So says our author, and he concludes that the object of study should be this technique and not an alleged irreducible feeling of personality objectified in the object. This last is, he holds, quite fruitless as a principle of explanation or description. Here speaks the author of *L'Esthétique expérimentale contemporaine*.

He is from the beginning of the article obviously hostile to everything smacking of 'le sentimentalisme' and not less so if it chance to be 'le sentimentalisme allemand.' There is point in most of his criticisms, but exception might be taken to his practice of attacking the form of the doctrine held by Volkelt or some one else and seeming to regard the result as a victory over the doctrine generally. Its advocates do disagree, and there is still much vagueness and uncertainty about the meaning of the conception. If he means to say that its supporters have not yet shown that it is an adequate description and explanation of all the facts, most readers would agree. But is every form of subjectivism to be condemned? There would certainly seem to be room in æsthetics for a description of the æsthetic experience in terms which might not be further analyzable, and also for a thoroughgoing study of the technique of the arts as furnishing the objective conditions for this experience.

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NOTES AND NEWS.

The following changes have recently occurred at German universities: Professor Benno Erdmann has been called to Berlin to the chair left vacant by the death of Professor Paulsen. Professor Oswald Külpe has succeeded to the chair at Bonn and will found a psychological laboratory there; Dr. K. Bühler, his assistant and Privatdozent, accompanies him. Professor Karl Marbe has been called from Frankfort to Würzburg to the chair and laboratory directorship. Professor E. Meumann has succeeded to the chair at Halle left vacant by the death of Professor Ebbinghaus. Professor Ebbinghaus' successor as editor of the *Zeitschrift für Psychologie* is Professor F. Schumann, of Zurich.

Professor E. C. Sanford, of Clark University, has been chosen to succeed the late Carroll D. Wright as president of Clark College.

A. B. Sutherland, Ph.D. (Chicago), has been appointed assistant in psychology in the Government Hospital for the Insane at Washington.

The present number of the Bulletin, dealing especially with the Psychology of Value, has been prepared under the editorial care of Professor W. M. Urban.

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THE

PSYCHOLOGICAL BULLETIN

THE PHYSIOLOGICAL BASIS OF RELATIONAL PROCESSES.

BY PROFESSOR MARGARET FLOY WASHBURN,
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The recent attempts at experimental investigation of thought processes, and the widespread tendency towards the recognition of 'non-sensory' elements as essential components in experience, suggest a number of interesting problems with regard to the classification and placing of these elements in psychological systems. It is impossible not to recognize that much of what goes on in our minds cannot be described, as a result of direct introspection, in terms of sensations. The 'Bekanntheitsqualität' may be accompanied by muscular relaxation, but it certainly is not a complex of muscular and strain sensations in the same sense that a chord is a fusion of tone sensations. The consciousness of the incompatibility of two statements appears to be an experience which, if analyzable at all, is not by immediate introspection reducible to a group of sensations whose members can be identified and localized. And yet there are two reasons, at least, why it would be desirable, if the thing could be done, to make sensory processes the all-sufficient components of such experiences.

The first reason is that in just such experiences as familiarity, contradiction, and the like, even ordinary introspection reveals sensational elements intimately involved, at least, — half fused, as it were, with the total experience, which declines to get on without them and yet declines to fall apart and resolve itself into nothing else. Familiarity is so nearly, and yet not quite, a relaxed and comfortable bodily attitude, describable in terms of muscular and organic sensations; contradiction is almost, yet not quite, the bodily sensations arising from the inhibition of a movement partly initiated, as when we start to act on one statement but are brought up short by the thought of the con-

tradictory one. And if the Wundtian solution be adopted, and we find in 'feelings' of strain, relaxation, excitement, and so on, with their combinations, the psychic material that is needed to supplement sensations, here also a good case may be made on purely introspective grounds for identifying, at least partially, these 'feelings' with complexes of organic and muscular sensations; strain and relaxation involving rather the latter, excitement and depression including also the former. In a word, introspection reveals the relational processes as partly reducible, and partly irreducible, to sensory components. They are so nearly sensory that it is no wonder we are tempted to think that better introspective analysis would make them wholly so.

The other reason why some of us would be glad, if possible, to bring about such a result is physiological. The fact is that the one physiological process upon which we can really rely, which we really know, as an antecedent of change in consciousness, is the process initiated in a sensory nerve ending. We have a reasonable assurance that the appearance of the color red in our minds is connected with an excitation process in the optic nerve. We can hazard certain fairly plausible conjectures as to what physiological process underlies a reproduced or 'centrally excited' red. Other changes in consciousness, like those produced in association and attention, must apparently be due to processes wholly within the brain, but unfortunately of the nature of those processes we know almost nothing. Not only are the externally initiated afferent changes in the nervous system those whose nature is most familiar to us, if one can speak of familiarity where so much is obscure, but they are also the oldest, phylogenetically. The development of the peripheral nervous system precedes that of the central nervous system. In so far, then, as we can reduce our developed and complex human mental processes to sensory components, thus far do we succeed in finding a fairly solid and ancient physiological basis for them. Otherwise, we are driven to hypotheses such as that the outgoing nervous process is itself accompanied by specific mental modifications, or that peculiar psychic states accompany excitations in 'association fibers'; hypotheses made as it were out of whole cloth.

Is it then possible to solve the puzzle of these refractory constituents of experience by admitting that they are not, for immediate introspection, sensational, while yet holding that the physiological processes underlying them are of the ordinary sensory type? I think that it is. But before proceeding to consider how such a solution can be reached, a few remarks on the conditions governing psychological analysis may not be out of order. One great source of

the lack of unanimity in psychological theorizing at the present time is lack of agreement as to the conditions under which the definitive analysis and description of a mental process shall take place. For example, it is obviously necessary to choose between the analysis of a process during its immediate experience, and its analysis by later reflection, that is, by reviving the process after it has run its course. To take a well-worn example, an emotion is analyzed into a fusion of organic and kinæsthetic sensations, but obviously the emotion as directly experienced would not be described by the subject as a fusion of sensations at all. For him it is an absorbing and unanalyzable moment of experience: it is only by calling up a weakened reproduction of the emotion that he can recognize, post mortem, the actual significance for it of the organic and kinæsthetic sensations. Most of us, however, would agree that the final and authoritative description of a mental process is that based on subsequent, not on immediate, analysis. Again, we may ask whether the definitive description of mental processes is to rest their analysis when in the focus of consciousness, or whether we may include among the products of our final analysis certain bits of experience found only in the marginal regions. This is a point which needs further discussion. There are, in fact, two senses in which the word 'marginal' may be used. One of them is the familiar application of the word to whatever is in consciousness but is not at a given moment attended to, although it may be as soon as attention is 'turned' to it. For instance, the sound from an electric fan in the next room was, until just now, 'marginal' to my consciousness in this sense: at any moment I might have attended to it, as I am doing now, and when I attend to it, and it ceases to be marginal, I can distinguish in the sound elements of tone and noise, I can roughly identify the pitch of the tone elements, and so on. It is clear that when 'marginal' is taken in this sense, the question as to whether the final analysis of mental processes must necessarily be only of focal processes answers itself: of course no process is analyzed unless it is attended to, and if it is marginal in the sense of not being attended to, it is not susceptible of any adequate description.

But another possible meaning of the term 'marginal' may be thus illustrated. A chance remark of a friend suggests to me something that I have recently read, yet I cannot recall more than the vaguest aura of the substance of that something. It is not because I am inattentive to the aura that it does not develop itself further: I am giving it the most painful attention; it is 'focal' in the sense of pushing aside every other consideration for the time being, yet in another sense

it remains persistently marginal. It will not come. The reasons for the indistinctness in which the sound of the fan remained are apparently different from those which condemn the half-recalled idea to obscurity. In the former case the laws governing attention are responsible for the insufficient clearness; the sound of the fan is marginal because it is monotonous and unconnected with any process already focal. In the case of the idea, the process of association is blocked for the time being so far as the idea needed is concerned. Evidently, however, to say that the failure in the first case is one of attention and in the second case one of association is to ignore the intimate relation of attention and association to each other. It was really a process of association that rescued the sound of the fan from the marginal region of my consciousness just now; I was looking for an illustration and the whirring noise from the next room 'suggested itself.' It had been marginal previously partly because no associative process had led in its direction. The forgotten idea, on the other hand, is still marginal, because the processes of association leading in its direction are for some occult reason not strong enough to produce it. We might use the term '*obstructed*' to designate mental processes in the condition of this idea: the obscurity of an obstructed process may be only temporary, like that of a marginal process in the ordinary sense, but something more than the mere 'turning' of attention in its direction is necessary to remove the obscurity.

Now the question whether definitive analysis and description of mental processes is to include *obstructed* processes is one bearing directly on the main subject of the paper. In reading the introspections of Bühler's subjects, for example, one feels sure that some, at least, of the non-sensational elements discovered by them are precisely such 'fallings from us, vanishings' as represent in my present consciousness the refractory idea I am in search of; that they are processes which for the time being are obstructed, but which may on some other occasion emerge into clearness and prove to be complexes of sensational elements.[1] Because they are temporarily non-sensational, must we class them as permanently so?

If we need to distinguish sharply in our psychological analysis between processes which are temporarily non-sensory and those which are permanently so, we need equally to distinguish between 'sensory' as applied to mental processes which have *for introspection* a certain character, and the same term applied to mental processes whose *physio-*

[1] Cf. von Aster's criticism that the introspections of Bühler's observers confuse '*Kundgabe*' with '*Beschreibung*,' *Zeit. f. Psych.*, Vol. 49, p. 57.

logical substrate is the excitation of sensory centers, by either of the two ordinary methods of such excitation, the stimulation of an afferent nerve or the transfer of energy from another cortical center. My vaguely recalled idea which refuses to develop itself is, while obstructed, non-sensory in the first meaning. I cannot analyze it, I cannot say whether its components are visual or auditory or kinæsthetic. Yet it may later develop into a perfectly definite and analyzable mental picture, revealing clearly identified sensory components. Am I not justified in thinking that on the physiological side it was sensory even in the obstructed state; that the sensory components it reveals when fully developed were represented in the obstructed state by ordinary sensory nervous processes, which for some reason were not being allowed to reach their full intensity? In other words, some, at least, of the elements in the obstructed processes may be based on ordinary sensory processes in the nervous system, and yet not reveal themselves to introspection as sensations. This is obviously the case with sensations that are not attended to, that is, not introspected at all, but they may be so readily invested with their full sensational character, localized, discriminated as to quality and intensity, that there is no danger of classing them as finally non-sensory, a danger which seems to exist for the obstructed processes.

Now if it is possible for processes that are through some obscurely caused inhibition prevented from entering into full consciousness even though they are in the focus of attention, to be based on sensory physiological processes while non-sensory to introspection, *is it not possible that certain mental contents which never, under any circumstances, fully reduce themselves for introspection to sensation complexes, may yet be wholly sensory in their physiological accompaniments?* My vague inkling of a nearly forgotten name is unanalyzable into auditory and kinæsthetic sensations, yet a few minutes later it may develop into a perfectly analyzable sensation complex: surely I may suppose that the physiological substrate of the 'inkling' was not different in character, only in degree, from that of the fully remembered name. The 'feeling of contradiction,' on the other hand, remains permanently irreducible to sensation elements, even though it has certain characteristic accompanying sensations. Yet may it not be that the nervous process underlying the feeling of contradiction is not a new kind of nervous process, involving association fibers, for instance, but simply a fusion of processes in cortical sensory cells, whose mental accompaniment remains permanently simple? Everyone knows, of course, that psychological analysis and physiological

analysis need not run parallel; that the nervous correlate of a simple mental content may be itself a highly organized combination, since mental analysis has evolved under conditions not identical with those which are responsible for simplicity and complexity in the nervous system. May not, then, a 'relational element' be based physiologically on an organization of sensory processes of the ordinary type?

It is quite evident that if this should be proved possible, it would not eliminate relational elements as unique constituents of conscious experience. If a process is never, under the most favorable circumstances, analyzable by introspection, then that process must remain for psychology unique and elementary. If it is not for introspection a sensational process, that is, if it cannot be localized and referred to one of the great sensation classes, then we cannot say that sensations are all-sufficient components of experience. But although proof that the nervous processes underlying relational elements are of the ordinary sensory type would not reduce these elements, as conscious phenomena, to sensations, it would nevertheless do important service. It would remove the necessity for finding a physiological basis for relational processes in modes of nervous activity which are not known to have any immediate conscious accompaniment, and it would make conceivable a genetic affiliation between sensations and relational processes: it would give them a common physiological ancestry.

Now of course it is utterly out of the question with our present resources to prove the nature of the physiological correlate of any mental process: it is only, as we have seen, in the case of sensations that we have any approach to definite knowledge on the subject. But one pertinent question may be asked of the person who wishes to maintain that relational processes are on the physiological side sensory in character. A suggestion may reasonably be demanded as to *what kind of sensory processess have fused to form the basis of these introspectively non-sensory contents?* And to this question it seems to me that the answer most likely to be true is: kinæsthetic sensory processes.

The least weighty reason leading to this answer is that all the other sense-classes, except the closely associated group of organic sensations, seem obviously unavailable. Since the relational processes are experienced in connection with every kind of external object, actually perceived or recalled in idea, we cannot think of them as inseparably connected with any single class of sensory excitations coming from outside stimuli, such as those of sight, smell or hearing. But of course this is taking for granted that their basis is sensory at

all, an hypothesis which we hoped to support by presenting kinæsthetic processes as eligible candidates for the office of their physiological representative. We may pass then to a second consideration. The most important, at least, of the relational processes may be described from one point of view as 'attitudes.' Contradiction, for instance, certainly often involves a kind of hesitation: we assume that a certain statement is true, that is, we prepare to act upon it, *but* a possibility arises which is contradictory, that is, which demands an opposite course, and our tendencies to act remain balanced. Expectation, the hypothetical and conditional 'feelings,' familiarity, all certainly imply typical motor states, which must mean typical kinæsthetic sensory excitations. It is not unnatural to suppose that while some of these sensory excitations produce kinæsthetic sensations that can be distinguished and identified by introspection, others may be so fused that their results on the psychic side form the unanalyzable relational process. This of course simply reverts to the point mentioned above: if kinæsthetic sensations are the most characteristic accompaniment of relational processes, why may not kinæsthetic excitations, more closely fused, be the basis of the relational element itself?

But another question that demands attention is, thirdly, regarding the *probability* of such a fusion of kinæsthetic excitations to form the basis of relational processes. Broadly speaking, there are at least two principles that determine whether several sensory excitations, affecting consciousness simultaneously, shall produce a mental process that is introspectively unanalyzable or one in which the results of the various excitations can be distinguished as separate components. In the first place, the older the association of the excitations in question, the more frequently they have affected the organism at one and the same time, the more their psychic accompaniments tend to fuse. In the second place, mental analysis is, like everything else connected with the organism, a product of necessity and adaptation. The different factors of our conscious experience have been subjected to the amount and kind of analysis that they have most needed. Analysis has developed where it would do the most good; for instance, organic sensations have from a practical point of view needed little analysis, and they have had little; contact stimulation has needed local rather than qualitative analysis, and it has developed the one at the expense of the other. It is unnecessary to point out that these two principles, that of frequency of association and that of adaptation to needs, are not coördinate and independent, nor is it necessary here to discuss their intimate relations. The point I wish to emphasize is this: can it be

shown on the one hand that the fusion of kinæsthetic sensory processes which we have conjectured as the basis of relational mental processes is a fusion based on the frequency with which the sensory excitations have been associated? And on the other hand, can we find reasons why, from an adaptive point of view, analysis of the conscious effect of kinæsthetic excitations beyond a certain point has been unnecessary and undesirable? Both of these questions, it seems to me, may be answered in the affirmative.

As regards the first, if the physiological basis of those components of relational processes which remain permanently non-sensory is a fusion of sensory processes resulting from an 'attitude' of the organism, then, in order that this fusion shall be so close, the attitudes involved must be phylogenetically very old. The ideal method of reasoning here would consist in naming all the elementary relational processes, and showing that each one of them requires a distinct and ancient attitude, so firmly implanted in the organism that the afferent impulses it produces result in an unique and unanalyzable psychic content. But this method unfortunately cannot be followed. Psychological opinion with regard to the number and classification of relational processes is in an absolutely chaotic state: logical and psychological motives are hopelessly intermingled in its discussion, and if I were to give my own enumeration and grouping of those processes, which I am by no means ready to do, it would take the rest of my space to explain and justify it. The best that can be done is to point out that the most important and generally accepted relational processes, such as the 'feelings' of likeness, difference, opposition, conditional dependence, do represent attitudes of the organism that are very old indeed. As soon as an animal capable of making more than one kind of response to external stimuli was evolved, the nature of its responses must have been modified by the fact that sometimes one stimulus acted repeatedly and demanded an identical reaction (sameness); sometimes shifting from one form of response to another was required (difference); sometimes two stimuli acted at once tending to call forth opposite and incompatible reactions (contradiction); and sometimes a response which needed two or more stimuli in succession to call it forth had to be suspended, after the first stimulus was given, until the second one arrived (conditional dependence). We are not suggesting of course that anything like the *consciousness* of sameness, of difference, of contradiction, and of conditional dependence accompanied these early reactions; they may have had no psychic aspect whatever, but the point is that they must certainly have been primitive, and that

when the nervous system developed and the association of afferent impulses became possible, the afferent kinæsthetic impulses from these typical attitudes must have been associated from the beginning. As attitudes, they antedate most if not all of the emotions; they are certainly older than the differentiation of sex, far older than the instinct of imitation because they must go back to a time before those sense organs upon which imitation depends were developed; perhaps even older than the oldest roots of the fighting instinct.

We can thus in certain typical instances of relational processes conjecture a history long enough to account for the closest possible fusion of sensory excitations into combinations whose psychic accompaniment is wholly irresolvable and unitary. But not only from this point of view can we see how such fusions may have been possible. There are reasons why kinæsthetic mental processes should, for the welfare of the organism, have remained unanalyzed. The chief need, from the point of view of safety, has been the analysis of impressions received from the external world. As I have elsewhere[1] tried to show, an animal, supposing it to have a limited stock of what we may figuratively call mental energy to expend in analysis, cannot afford to withdraw that energy from the direction of its outward environment, so full of peril and ministry to needs, and turn it to the investigation and analysis of processes arising within the organism. Hence attention to kinæsthetic sensations is probably a late development, made possible very likely by the prolongation of the period of infancy, during which the organism is protected from these practical conditions which require attention and analysis to be externally directed. The mental effects of kinæsthetic afferent impulses must have long remained in a stage where attention had never been directed to them, and where they consequently had never reached the status of sensations, localized and qualitatively discriminated from their conscious background. It is not incredible that in the case of certain combinations of such impulses the psychic effects should remain permanently non-sensory, so far as introspection is concerned.

In summary, then, it may be said that introspective analysis of our experience reveals certain processes which are not to be classed as sensations, that is, which are not localizable or referable to a particular sense-organ, and the nature of whose dependence on other processes has caused the term 'relational' to be applied to them. There are two reasons why it would be desirable to show that the physiological processes underlying them are of the ordinary sensory type. First,

[1] *The Animal Mind*, p. 282.

certain sensation fusions accompany and characterize them so intimately that some psychologists have thought them actually identical for introspection with these sensational accompaniments; hence it would seem possible that whatever remains irresolvable into sensations may be simply a 'core' based on more intimately fused processes of the same nature. Secondly, the sensory nervous process is one about which we know more, it is of a less conjectural and made-to-order character, than other hypothetical cortical processes that have been suggested as a basis for the relational processes. And there are three reasons for thinking that the physiological substrate of relational processes may be a close fusion of kinæsthetic sensory impulses. First, no other class of sensory excitations, except possibly the organic, would be equally capable of accompanying excitations from all the other senses, and thus of being the basis for 'relations' between all kinds of objects; secondly, the sensations which introspection finds most closely associated with the relational processes are kinæsthetic in character, and the most important and typical relational elements are describable as 'motor attitudes'; thirdly, the closeness and permanently unanalyzable character of the fusion of afferent kinæsthetic processes required by this theory would be accounted for on the one hand by the fact that the attitudes concerned are very old in the history of living beings, and on the other hand by the consideration that attention to and analysis of the psychic processes immediately resulting from movement has been for sufficient reasons a late and imperfect development.

PSYCHOLOGICAL LITERATURE.

GEGENSTANDSTHEORIE.

Ueber die Stellung der Gegenstandstheorie im System der Wissenschaften. A. MEINONG. Leipzig, 1907. Pp. viii + 159.

Professor Meinong's latest defense of *Gegenstandstheorie* is not so wholly negative as his words at the end would imply: "Its task could be no more than to remove obstructions" (p. 149). There is much new light, and more inducement to the science in question, than he has yet given us. As he rightly says, the science is not merely a program, but an actual body of knowledge — witness the volume *Elemente der Gegenstandstheorie* (Leipzig, 1904). In the past much has been, under other titles, contributed to it, as for example in pure mathematics, grammar, logic, psychology, etc. Some hitherto unrecognized *Gegenstände* are noted in Sect. I., *Homeless Objects* — those which have up till now found no proper home in any science. Such are colors, tones, or other sense-qualities, considered for themselves, apart from the psychoses in which we apprehend them (p. 8), yet not as physical. A *gegenstandstheoretische* problem in connection with them is, do the colors arrange themselves naturally in a sphere or a hexagon? Another problem would be: is the tone-series in itself infinite or finite? This distinction of object from psychic content is not uncommon, of course, but the question is, are such 'objects' important enough in their aloofness to deserve a separate theoretic treatment in a new science? That they are, is seen when we remember their number and the character of the knowledge with which we know them. In their number is included, further, impossible objects, such as round squares, etc. A beautiful study of these follows: they are not subject to the law of contradiction, which applies only to the actual and possible (p. 16), nor are they only 'flatus vocis' for these have physical attributes alone. Again, the impossible objects are used in every indirect proof. The treatment is extremely suggestive in many ways here unmentioned, and we hope that Professor Meinong will some day give us a monograph on the impossible object. Other *Gegenstände* are the *Objektive* (p. 20), with which readers of *Ueber Annahmen* are familiar. Their characterization we anticipate from the later and fuller statement (p. 124): the *Objektiv* is to the judgment as the *Gegenstand*, say, color, is to the existent, say, the

psychical apprehension of color. Further objects are the meanings *true* and *false*, *necessary* and *contingent* (p. 25).

The second section, *The Peculiar Mode of Knowledge in Gegenstandstheorie*, takes up the second justification mentioned of the science, the fact that it gives *a priori* knowledge. *Gegenstandstheorie* is 'daseinsfreies Wissen' (p. 28), and 'Einsehen mit Verstehen' (p. 31), which are equivalent to *a priori* knowledge (pp. 33, 50, 51). The denotation of *a priori* is broader for Meinong than for most logicians, though we think he is correct. Thus he says that of two different things A and B, the judgment *A differs from B* which follows not from their existence (*Dasein*) but from their character (*Sosein*), is *a priori*. So, too, *black is not white* is *a priori*. A relation, in general, is an 'object of a higher order' than its terms and as lacking *Dasein* becomes a *Gegenstand*. A very good touch here is the counter-doctrine that *a priori* knowledge, holding of the *Sosein*, may yet apply perfectly to the *Dasein* (pp. 36, 51, 106–7). There is no such gulf between *Gegenstand* and *fact* as the 'logistic' writers, following the Kantian tradition, would make, and herein Meinong escapes those criticisms which are based upon the extreme abstractness of current exact logic.

Section 3 is a closer study of *Daseinsfreiheit*. That term does not connote non-existence (as has been suggested already) but indifference to existence or non-existence. This attribute contributes to the satisfaction of a *special theoretical interest* (p. 43), quite other than the one which would know reality for its own sake. This, we must admit, is good psychology; there are two kinds of theoretical need, one directed toward the real, the other toward the merely objective. This positive character of *Gegenstandstheorie* is defended further as follows: the judgments composing it (*e. g.*, these of pure geometry) are not negative, nor hypothetical, or approximative (p. 47), but are irreducible positive judgments. This is an excellent refutation of certain current views of the universal judgment.

Section 4, continuing the subject of section 2, is a further study of *a priority*. On the positive side *a priori* knowledge is grounded objectively and is necessary (pp. 51–2). Mathematical knowledge is wholly *a priori:* here follows (pp. 62–102) a long, difficult and complicated discussion which might well form a separate book. We subjoin but one point, though a crucial one. The parallel-axiom is not empirical but *a priori*. *Gegenstandstheorie* shows that "two intersecting parallel straight lines are always an impossible object" (p. 88). "Plane, spherical, pseudospherical, etc., geometries treat of

different *Gegenstände*" (p. 90). Each geometry is thus *a priori*. We feel a difficulty here. If plane 'parallel intersecting lines' are impossible objects, they form (as we learned, p. 14 ff.) a branch of *Gegegenstandstheorie*. And as they are about geometrical objects, why may they not form a separate geometry? But if so, that particular geometry would abolish the necessary connection between plane, parallel, straight, and non-intersecting. What kind of a necessity is it that can thus, without the intervention of new conditions, be abolished? The parallel-axiom seems to lose its *a priori* character.

The fifth section (*Defense: Logic and Gegegenstandstheorie*) is occupied with oddments, which, however, throw light on many points. First is a polemic, replying to E. Dürr's strictures and leading to the distinction of logic from the new science. Here is much subtlety. Logic deals with concept, judgment and reasoning. Concepts are 'incomplete objects,' being abstract (p. 122). So "all which in the concept may attract theoretical interest, will also pertain to the nature of the concept's object" (p. 123). Hence logic as concept-theory *contributes* to the new science, but strictly is not a part of it, as the concept is not itself a full 'object.' So too of judgment. The *Objektiv* of a judgment is a *Gegenstand*, the judgment itself is not. And of reasoning we find: "certain characteristic connections of *Objektive* . . . these it is to which logic, as the doctrine of inference, must apply," "yet it is not itself the doctrine of these connections, but it is to the latter doctrine only as to its foundation" (p. 127).

It seems to us unimportant to distinguish logic so carefully from *Gegenstandstheorie*, so long as the individual problems of each are properly worked. Still we accept with thanks the distinctions of *concept* and *Gegenstand*, of *objektiv* and *judgment;* they are indeed indispensable to future work.

The sixth and last section defines and defends the desideratum of the science. There is a distinct theoretical need here to be satisfied. But can there be found sufficient unity among so utterly different and apparently unrelated *Gegenstände* as the science must take in? We cannot tell beforehand, but if metaphysic does not despair of finding a unity behind all *realities*, surely *Gegenstandtheorie* may hope as much from its group of *a priori* knowledges (p. 135). Incidentally the empirical and *a priori* are here contrasted, the former dealing with the existent, the latter with what is indifferent to existence. It is not wise, we are told, to call all knowledge empirical, as 'radical empiricism' does, though in a sense it is true; for thus we obliterate the distinction of 'existent' and 'indifferent thereto' (p. 141). 'Psychologismus'

"consists mainly in confusion of an object with a psychosis (intellectual always) which really or presumptively apprehends it, or could do so" (p. 143), and as such is a fundamental error. On the other hand, a properly directed psychology is not excluded, but even needed; witness much of the present book, which is largely psychological. The laws of thought are here interpreted not as controlling our psychical processes but as true of *Gegenstände* (p. 147) and thus having the objective character which in general distinguishes Meinong's *a priori* from the more usual Kantian *a priori* — much to the credit, we believe, of the former.

Altogether the book will be welcomed by all who appreciate the importance of Professor Meinong's recent labors. It is, however, we think, a pity that so clear and fundamental a thinker should have so forbidding a style; forbidding not so much from lack of elegance — of course a minor matter to the scientific investigator — as from lack of clearness and distinctiveness in the stages of the argument.

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THOUGHT PROCESSES.

Die psychologische Beobachtung und experimentelle Untersüchung von Denkvorgängen. E. v. ASTER. Zeitschr. für Psychologie, XLIX., 56–107.

Taking the pioneer work of Marbe in the experimental investigation of the process of judgment as his starting point, Aster subjects the results of experimental investigations of the thought process to a critical discussion. Marbe's quest for a characteristic immediate fact of experience which might be identified as the judgment process *per se* was doomed to failure; all that his experimental material indicated was an unconscious disposition or attitude (Bewusstseinslage), which was not immediately experienced the moment a judgment was made. From Marbe's beginning up to the present the indications have pointed in the direction of an immediately experienced thought process differing fundamentally from sensation and presentation. In Bühler's work the conclusions indicate the existence of immediately observed experiences which can only be described as 'consciousness of,' 'knowledge about,' 'consciousness that,' etc. These are distinguished from unconscious dispositions as immediate facts of experience. He thinks that the reason why Marbe's subjects failed to find such facts was because the task which they were given was so simple that it did not arouse a proper thought process. The specific conscious content just

mentioned Bühler considers to be incapable of further analysis, and to contain the characteristic properties of all cognitive processes.

Aster makes a comprehensive examination of the material gathered by Bühler, Messer, Ach and others from which the above conclusions as to the nature of the thought process were drawn. First in reference to the conscious experience of meaning, aside from any related presentational content; when a reagent says that he does not understand a word until after he has heard the sound one is justified in assuming a process in which the meaning develops. There is no justification, however, for saying that the process is present in pure form when a word appears which is familiar, but for which I have no presentational meaning. A Latin word may appear; it is familiar, but I have long forgotten the meaning; there is no abstract meaning process in this case. 'Consciousness of' something, the meaning does not come explicitly to consciousness as a particular content in such cases. I am asked: Do you understand Hebrew? I answer yes, and then find that I do not, or that I do. In either case there is implied the assertion of the possibility of relating definite presentations to the word Hebrew, there is an unconscious 'gefühlsbetonte Bewusstseinslage.' Taking such material as the above, Aster contends that one is not forced to the conclusion that there exist, as explicit facts of consciousness, such items as 'consciousness of,' 'knowledge about,' etc. It is pointed out that utterances of Bühler's reagents are expressions of the processes experienced; they are not descriptions of those processes in consciousness. Thus to reach the results presented by the experimenter those utterances of the reagents are not themselves conclusive, the results are the interpretation of the material. Aster, as indicated above, considers that the material is only conclusive in respect to the existence of 'gefühlsbetonte Bewusstseinslage.'

In an added paragraph Aster contends against Orth that these Bewusstseinslagen attitudes of consciousness are closely akin to feelings (lust-unlust). Like feelings they are not self-dependent; they are never present in consciousness unaccompanied by presentational content of some kind. "They stand as peculiar groups of dependent experiences over against the independent analyzable foundation of conscious life, which is made up of sensation and presentation content." Aster's article is a clear and forcible discussion which brings out admirably the fundamental points which have been developed in the recent experimental investigations of the thought process.

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Bemerkungen zu meinen 'Experimentell-psychologischen Untersuchungen über das Denken.' AUGUST MESSER. Archiv f. d. ges. Psychologie, X., 409–428.

The purpose of this article is to defend the method of procedure and conclusions of his experimental investigation of the thought process from criticisms of Meumann and Bühler. Meumann contended that Messer's results showed the effect of confusion on the part of his reagents, arising from the nature of the task which was required of them by the experimenter. In an association experiment Messer required his reagents to first read and understand a printed word exposed to their view, and thus react as quickly as possible to the first word which entered consciousness. In Meumann's view the confusion arises from a division of the attention between (1) the exactness with which the meaning of the word was to be apprehended and (2) the speed of the reaction. Messer agrees that such a double task as Meumann speaks of would be fatal to the end at which the experiment was aimed, but shows that in his work due emphasis was laid either upon the one phase or the other of the task, so that confusion was impossible.

He agrees with Bühler that his description of the process of judgment as distinguished from the simple associative relation is not sufficiently definite. His revised statement makes the judgment process actively assert a complete and definite relation between the stimulus and reaction presentations; a relation merely contemplated as possible would not be admitted under the category of judgment. In association the relation between the two presentations appears objectively present, my attention is directed to it, but it is not of my making.

Messer agrees with Bühler that the processes of consciousness may be divided into two general classes, (1) sensations and their reproductions, which are concrete (anschaulich), (2) thoughts which are (unanschaulich) abstract. He finds that the meaning even of words and sentences may be present in abstract form (unanschaulich). He further shows that Bühler's general divisions, 'direct' and 'indirect' meaning, do not cover what he comprehends under the general divisions, 'gegenständliches' and 'begriffliches' thinking. Under the former Messer includes those processes of thought in which the object as it enters consciousness is complete and concrete. In the latter he places those cases in which the process from stimulus to reaction runs more smoothly, is more superficial and mechanical, the reaction time is shorter and more like a simple verbal reaction, and the meaning as a rule is not clearly distinguished from the word.

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Ueber die Abstraktion der Gleichheit. A. A. GRÜNBAUM. Archiv f. d. ges. Psychologie, 1908, XII., 340–478.

The experimental work reported under this title is an attempt to approach by modern methods the old metaphysical problem of abstract ideas. An essential element of the process, known to logicians as abstraction, is the perception of identity between one or more elements of two complex groups, the fixation of these elements in mind and the neglect of the surrounding elements, which are not common to the two groups. This perception of identity was the object of research in Dr. Grünbaum's dissertation.

The method he used is rather new, if not entirely original. It consisted in exposing two groups of simple but unfamiliar figures. One of the figures was common to each group and the others were all different. The subject had a two-fold task to perform; (*a*) the primary task: to find and reproduce by drawing the common element. (*b*) The secondary task: to note, so as to be able to recognize, the other figure when shown the groups after the experiment was over.

The process by which the primary task is performed admitted of division into eight different classes. Some of these divisions represent totally different methods of procedure, others are probably stages in one and the same method. The author, however, does not bring out this distinction. The study of some of these methods (*e. g.*, the method of comparison with its various stages of accentuation of the common element) will throw no little light on the psychology of abstraction. The intuitive method would have appeared less mysterious had Dr. Grünbaum pushed the inquiry a little further and taken into consideration our subconscious or unanalyzed mental contents.

In the primary task it is interesting to note the way in which the subject falls short of perfection in reproducing the common element. (1) Instead of the perfect and complete form, he will often give one that is schematically correct. (2) The subject will often draw a part of the figure and will know that something is lacking but will be unable to supply it. (3) The correct form will be changed but still remain recognizable. The most interesting case of this kind is what Dr. Grünbaum has called 'mirror-drawing'; the figure is drawn as if from its reflection in a mirror.

The success with which the primary task is accomplished decreases with the increasing number of figures in the groups. But the rate of decrease is not constant. It reaches a maximum in passing from four to five figures in a group and then rapidly declines.

The secondary task consisted in the recognition of all the figures

that could be remembered after drawing the common element. As the number of figures in each group increases, the subject remembers an ever-increasing number of figures. But when you compare the number of figures remembered with the entire number exposed, the fraction remembered decreases with increasing number of figures in each group.

The author compares the fulfillment of the secondary task in recognition by the method of succession with, and that without accentuation of the figure. It would appear that the accentuation or the becoming prominent of one figure during the progress of perceiving identity lessens the number of figures remembered over and above the common element. From this it would seem that with the accentuation of one figure, the negative process of abstraction from the surrounding figures is already begun. The evidence shows that the secondary task is fulfilled better when the primary task is not accomplished. In other words, the perception of the common element tends to obliterate the surrounding figures.

From the experiments, it would seem that the process of abstraction is brought about by an apperceptive accentuation and separation of the common element. On the other hand, the surrounding figures are forced into the background and lose something of their conscious value.

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Etude sur la réflexion. ETIENNE MAIGRE. Année psychologique, 1908, 380–389.

M. Maigre speaks in this article of two kinds of reflection, (*a*) one in which the subject fixes his mind voluntarily or automatically, or even in spite of his will upon a special image, or a fragment of an image or idea; (*b*) the other in which the mind makes a special effort toward some definite end — tries to get at the bottom of a problem.

On the second form of reflection, M. Maigre has made some experiments. He assigned to a number of young pupils the task of solving geometric problems, and while he appeared to be seeking the solution and working at the problems himself, he was in reality observing them and their methods. As a result of this observation and study he analyzes the process of reflection in this manner:

The first step is the adoption of some point of departure. This leads to a train of associations. These may or may not help towards the solution of the problem. If so they are followed up, if not one returns to his starting point and goes on as before.

If this is so, one may ask: (*a*) How can one stop the train of associations after he sees they are no longer useful? (*b*) How does one return to the first idea? (*c*) How is it that one does not follow the identical train of ideas that he pursued before?

The first and last processes depend upon the change in the emotional state of the subject. The second is accomplished by a voluntary act.

This analysis — supposing it to be correct — cannot in any way be directly connected with the experiment reported.

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Judgment and Apprehension. HELEN WODEHOUSE. Mind, 1908, N. S., XVII., 359–369.

The purport of this article is briefly stated by the authoress in the opening sentence: "I wish to set forth such arguments as most appeal to me in support of the thesis that judgment and apprehension are identical." This is done by an attempt to level down our concept of judgment to that of apprehension. The attempt is executed by pointing to the cloudiness which hangs over the dividing line between judgment and apprehension, and by a criticism of the arguments advanced by Stout and Brentano in favor of the traditional distinction.

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REASONING.

Experimentelle Untersuchungen über einfache Schlussprozesse. G. STÖRRING. Archiv f. d. ges. Psychologie, 1908, XI., 1–127.

Judgments involving relations of spatial and temporal order, order of magnitude, and equality, as well as judgments of subsumption and attribute, were the subject of this 'experimental' study. Pairs of premises were exposed on cards before the subject and he was required to draw an inference of which he was certain, and then to describe, as far as it was possible for him to recall them, his mental operations during the process. The terms in the premises were always letters of the alphabet. The reaction times were taken, but the subjects (following a caution of Meumann's) were assured that speed was not a consideration.

Lange's contention that inferences always involve spatial representations was the starting point, and then the question whether the inference arises or not from a simple synthesis of the premises. On these two points a large amount of original and significant observation is submitted; but there is no coördination of this material nor any statement of its general bearings, so that the reader must glean for

himself what little grain of comfort there may be for one or the other of the mooted theories. Of the judgments reported, many seem to have been formed without any consciousness of imagery, but the conditions are not controlled in such a way as to prove that there were no images involved. On the other hand the very simplicity of the material sufficiently accounts for many of the judgments which were simply read off without conscious identification of the middle terms or awareness of the full relation between the premises, and in some cases without even a full sense of the meaning of the single premises.

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A Preliminary Study of the Psychology of Reasoning. WILLIS L. GARD. Amer. Journal of Psychol., 1907, XVIII., 490–504.

Does the syllogism correctly express the psychic process involved in reasoning? This is the question which Gard has submitted to an experimental test in the present investigation. The material for the tests consisted of examples in division, multiplication, and addition, in which some of the figures were given while others were omitted and their places taken by x. The task of the subjects was to supply the missing figures and, at the same time, to try to ascertain how they discovered them. The result shows three general methods of solving the problems. First, by direct substitution, *i. e.*, the ability to perceive the missing figures as soon as the data are apperceived. Second, by the immediate perception of a general principle involved. Third, by trial and error.

The author concludes from his study that the reasoning involved in such problems does not take the form of the syllogism. While in some cases the reasoning employed was capable of restatement in syllogistic terms, this logical process was rarely or never followed, and usually was not even used to test the correctness of the conclusion. The processes, he says, are those of apperception and association 'working under the special conditions of attention to the matter in hand.' Habit played an important part in determining the method of attack, and the reasoning often seemed to be an obscure insight or guess with an appeal to the method of trial and error. Some of the subjects were conscious of a vague background which guided the associations. This 'mental set' the author thinks is determined, on the one hand, by the problem as stated, and, on the other hand, by the general knowledge of numerical relations and interest in the solution. He adds, however, that this still leaves much that is uncertain.

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REPORTS AND DISCUSSION.

THE SIXTH INTERNATIONAL CONGRESS OF PSYCHOLOGY.

The sixth international congress of psychology was held at Geneva, Switzerland, August 3–7, with about 550 members in attendance. The sessions were opened by President Flournoy, who traced the history of the congresses since the first held at Paris twenty years ago, and explained the reasons for the plan adopted by this congress to hold the discussion to a limited number of topics, reports on which had been prepared on request by various investigators of these several lines of work. This innovation proved, on the whole, a very happy one, and although individual communications were not debarred, they formed for the most part a supplementation to the discussion of the topics chosen by the committee for special debate. Another innovation which proved itself valuable was the preparation in printed form of each of the general reports and many of the special contributions, so that the members were enabled to read them in advance, and thus be prepared for the discussion. In view of the various languages sanctioned by the congress, this was a thing of the greatest practical importance. It is to be hoped, however, that at the next congress the reporters will follow the excellent example set by Professor Külpe who refrained from reading his report and at once invited the discussion of it. A third innovation was the sanction of Esperanto as an official language. Several brief reports were made in this tongue to the end of advancing the claims of an international language as the proper medium of discussion for such a gathering. It seemed doubtful, however, judging from the opinions expressed, if the world of science is as yet ready to adopt such an ideal and artificial mode of expression for its reports. As the possible basis for an international terminology the language found rather more favor.

The Psychology of Religion was the first topic. It was introduced by Höffding (Copenhagen) who maintained that the religious experience was in its essence conditioned by a sense of limitation and dependence which found its expression in a demand for the continuance of that which we consider to be of value. Religious values thus became the keynote to his theory, and the study and systematization of these values was held to be the aim of the psychology of religion. The second speaker, Leuba (Bryn Mawr) took issue with Höffding in his position that the essence of religion was a sense of value. Leuba traced the origin back to primitive life before values have been

clearly apprehended, and considered the conception and belief in unseen forces to constitute the real essence of the religious experience. Religion was broadly defined as that portion of the struggle for existence which is made with the aid of certain spiritual forces, an active belief in such forces being regarded as the criterion of the religious experience. The discussion on this topic waged steadily in separate sittings during the remainder of the congress. Many more or less kindred topics including recent experimentation on spiritism were introduced, but it can scarcely be said that any very definite conclusions were arrived at. It is perhaps significant that a motion to continue this topic on the program of the next congress was voted down by a fair majority.

The second topic to be introduced was that of the Subconscious. The first to report was Dessoir (Berlin), who presented many bits of evidence to indicate the incalculable fullness of consciousness, and the importance of conscious 'fringes' in explaining such phenomena. The division of attention with simultaneous direction on different objects appeared to the reporter possible, and his conclusion was that the most important feature of the subconscious seemed not to be so much a peculiar quality or composition of content as the unique manner in which the content is combined. Janet (Paris) was unfortunately absent, but his report, which was available, was concerned with upholding the rather narrow use of the term introduced by him for referring to the peculiar inability of hysterics to note certain changes or omissions in their consciousness, although it is possible to prove that these factors still exist and exercise an effect upon their total mental state. As to any other form of the subconscious, Janet declines to accept it. The contribution of Morton Prince (Tufts) consisted first in a critique of the various meanings attaching to the term. Following came a discussion of the evidence which led the speaker to accept as highly probable (1) active co-conscious processes — as against the interpretation by rapid oscillation — (2) active but unconscious cerebration, and (3) brain dispositions in the form of unconscious, passive physical residua. The rather uncertain character of the entire discussion of this topic indicated, among other things, inadequate criteria for introspective results. It might perhaps be suggested that from the point of view of the new psychology of thought processes it may be possible to understand the splitting of consciousness and the attendant phenomena of depersonalization in much simpler terms than when one is confined to the older usage of more or less concrete and inflexible ideas.

This discussion was followed by an interesting contribution by Alrutz (Upsala) describing some experiments on the transference of nervous into an external expression of physical energy. Under the influence of strong suggestion exerted on rather sensitive or 'labile' persons, he was able to obtain with the aid of a specially constructed apparatus the registration of an increase in physical force too great to be accounted for by any direct physical means. The method used appeared to be simple and ingenious, and a more complete testing of it might be expected to demonstrate whether or not *telekinesis* is to be admitted to the realm of scientific fact. The program of the first day's session was completed with a very interesting exhibition of rhythmic gymnastics by the pupils of Jaques-Delcroze (Geneva). The apparent ease and grace with which his pupils, even at six to ten years of age, were able to express by step and gesture the most varying rhythms, including such irregular ones as 5 and 7, was most instructive.

The second day's session was opened by Decroly (Brussels) with a report on the classification of backward children. The classification proposed was in brief as follows: — I., Irregularities due to intrinsic causes. II., Irregularities due to extrinsic causes — that is, those which can be traced to the influence of the child's environment. The discussion hinged largely on the elaboration of the first of these classes, which was divided into two parts: (1) irregularities of the vegetative functions, and (2) irregularities of relational functions. Under (1) was distinguished (*a*) physical deformity and (*b*) disturbances of the nutritive organs. Under (2) came irregularities of (*a*) the senses, (*b*) movement, (*c*) mentality and (*d*) affective life. Each of these was subjected to detailed consideration. Ferrari (Bologna), who followed, proposed that the matter of classification be referred to an international commission appointed by the congress. The discussion was then carried forward by Persigout (La Teste de Buch), De Sanctis (Rome) and Schuyten (Antwerp). The latter called attention to a method used by him with success, in accordance with which not alone sub-normal, but also hyper-normal conditions were taken into account.

Next in order came the topic of Tropisms introduced by Loeb (California), who maintained that a scientific analysis of psychical phenomena must be referred to physico-chemical laws. In order to understand the behavior of animals we must look aside from teleological constructions and consider the tropisms and other primitive phenomena, not as existing in the interest of the animal, but at most as not opposed to its interests. Tropisms are not the only elements with which we have to deal. Differential sensitivity and associative memory

are also factors of prime importance. Jennings's attack on the theory of tropisms was subjected to criticism and in conclusion the importance of a physico-chemical interpretation of behavior for the psychiatrist and also for the ethicist was suggested. Bohn (Paris) followed with an expression of views which did not vary greatly from those of Loeb. Two kinds of activity of the two symmetrical sides of the body were distinguished as referable to qualitative and quantitative differences. Only the last, in his opinion, constitutes the tropisms. The former, consisting in associative memory, vital rhythms and differential sensitivity, were considered to be the cause of perturbations from the direct and invariable mechanical activity which the tropisms would otherwise occasion. Jennings (Johns Hopkins) was not present, but his report was available and indicated his belief that the tropism is a term for denoting " reactions in which orientation is a prominent feature," and that " such reactions form a part (a very minor part . . .) of the behavior of many organisms." A considerable debate was then entered upon which lasted through several special sectional meetings and waged principally about the subject of animal psychology. The rather narrow view of Loeb on the proper scientific procedure of the psychologist was, naturally enough, attacked. Loeb was forced to admit that the method of investigation which he has used with so much success on the lower forms of animal life, was not yet far enough advanced to be clearly applicable to the higher and more complex forms of mental activity. He thought, however, that the time might come when this ideal would be realized. Asher (Bern) expressed the opinion that a scientific animal psychology was, strictly speaking, an impossibility, since in the case of animals we are unable to deal directly with the phenomena of consciousness: that animal behavior, therefore, and human psychology remain two different problems which should not be confused. He attacked especially the treatment of animal behavior after the analogy of human experience.

The problem of the Standardization of Colors was discussed by Nagel (Rostock) and Asher (Bern). The former was rather sceptical in his views. The latter, however, was more hopeful and suggested that four liquids of the colors red, yellow, green and blue might be found, the chemical and spectroscopic analyses of which should be definitely ascertained and the liquids used as dyeing material for a standard set of colored papers. Thiery (Louvain) also presented a method of classification based on three fundamentals which he illustrated by colored figures of his own devising. It was then proposed that an international commission to include an organic chemist

and a physicist should be appointed to consider the feasibility of various methods of standardization and to make a report at the next congress.

The question of establishing a standard terminology for psychology was introduced by Baldwin (Baltimore) who reported briefly on certain general rules which had been found useful in the compilation of his *Dictionary*. The principal points made were in favor of the retention of words already in use, and the construction of new terms, preferably from Greek and Latin roots, to cover new conceptions not adequately named. In the several languages terms should be rendered, so far as possible, by analogous roots, and in no case should a term peculiar to one language or writer be adapted to a different use in another language. In adopting new terms their availability in other languages should be a prime consideration. The speaker then proposed that an international commission be appointed to consider this whole matter and report at the next congress. The report of Claparède (Geneva) on the same topic was much more detailed, especially with reference to the rendering of equivalent meanings for German and French terms. Certain general symbols were also proposed. In view of Baldwin's motion, which Claparède seconded, this report was not read. De Saussure (Geneva) spoke in Esperanto of the work already accomplished by the *Scienca Asocio Esperantista* towards an international scientific terminology, and urged coöperation along this line. At a later session Courtier (Paris) reported on his system of symbols. These are of Latin derivation, and can be expressed in algebraic form to convey the meaning of a large number of psychological terms and processes.

The third day's session was opened with an interesting contribution by Thauzies (Perigueux) on the capacity of carrier pigeons to orient at a distance. As a result of numerous observations extending through years of experience with these birds, the speaker had reached the conclusion that the phenomenon in question could not be explained in terms of sight and memory, a sense for its attitude — *i. e.*, the assumption of a constant orientation — or a specific 'sixth' sense for direction. On the other hand, a study of the meteorological conditions prevailing at the times of various successful and unsuccessful flights seemed to indicate a direct sensitivity for magnetic forces. Among the data noted was the observation that young pigeons never fly voluntarily to the west and rarely to the south. It is with much more difficulty that mature birds fly from north to south and from east to west, than from south to north and west to east. In a report on

the position of the body and its members with reference to the vertical, Bourdon (Rennes) gave his reasons, experimental and theoretical, for concluding that a static sense referable to the semi-circular canals does not exist. Experiments show that accurate judgments are always conditioned by innervation of the muscles, and the most that can be assumed for the semi-circular canals is that they are the seat of motor nerves. Disturbances of the organ may thus occasion disturbances in muscular activity which in turn condition peculiarities of orientation. It is interesting to note in this connection that Loeb in his paper reported a similar result from experimentation on lower animals. The removal of the otoliths, he found, did not cause the animal to lose its capacity for orientation provided the nerve was not destroyed. This is to him, of course, proof for a general geotropic function.

The fourth day's session had for its special topic Feeling. The first report was made by Sollier (Paris) who argued in favor of the reintroduction of the term *cœnesthesis* as applicable to the unique feeling of bodily existence and functioning. After the various meanings which may be attached to the term had been differentiated and evaluated, the conclusion was reached that cœnesthesis is primarily a feeling, not a sensation, and furthermore, with reference to cases of disturbed or altered personality, that it is a quality which attaches to perception, not to sensation. It is that feeling of association between our acts, past and present, which constitutes our personality, and may be further described as a sensitivity proper to the brain itself whereby we obtain knowledge of individual activity and personality. In the discussion which followed Patini (Naples) expressed the opinion that cœnesthesis might be the basis for the ego without being dependent for its existence on the sense of personality, while Prince (Boston) described a case of multiple personality in which one of the manifestations indicated marked loss of cœnesthesis without loss of ego.

Külpe (Bonn) offered the second report. It was divided into five sections. The first discussed the criteria of feeling, which were declared to be as follows: elementary conscious contents of pleasantness and unpleasantness, distinguishable from sensations in that they are in no specific manner dependent on sense organs and leave no ideational residua after them; from images in that they can neither be reproduced or associated, and from thoughts in that they constitute neither knowledge about things nor things as known. The following criteria were then discussed and rejected as possessing no characteristic or universal validity: — (1) subjectivity, (2) non-localization, (3) polarity, (4) unity, (5) inability to focus the attention upon them, (6) imma-

nence, (7) dependency on other conscious factors. A more positive expression of the criteria discovers a *universality*, in accordance with which nothing can impress us which is not capable of producing pleasure or displeasure, and a *reality*, on the basis of which feelings always possess their same real character whether referring to the past, present or future, and whether occasioned by sensation, image, thought or function. The second section described the kinds of feelings as in quality but pleasant and unpleasant, but as existing *singly* or as *common* feelings, *active* or *passive*, '*shock*' — coming and going quickly, or *temperamental* — coming and going slowly. In opposition to the possibility of qualitative differences of pleasantness and unpleasantness were noted among other points the following: — (1) the ability to compare feelings of pleasantness and unpleasantness although occasioned in different ways; (2) the possibility of unlimited compensation; (3) the irrelevancy of the accompanying feelings in the specific comparison of sensations, images and thoughts; (4) the inherent improbability of a larger manifold as indicated by the difficulty of making such a classification; (5) the fact of feeling irradiation from one impression to another. The third section considered the methods for investigating the feelings, and the fourth section the results of investigation. The last section dealt with the theories of feeling. These were divided into two classes: — (1) heterogenetic, in which feelings are reduced to other psychical contents, sensory or intellectual; (2) autogenetic, in which feelings constitute a unique class of elements to be explained physiologically, psychologically or psychophysically. The last of these modes of explanation was considered to be the most plausible, although it is impossible at the present time to carry it out in detail.

The report was presented without being read, and the discussion immediately entered upon. Bovet (Neuchatel) referred to the difficulty of cataloging under the simple categories of pleasantness and unpleasantness all the nuances of feeling which introspective results reveal. The reporter responded that introspective results could hardly be considered as normative for this matter, and that complex states described as feelings were often attributable in the main to organic and kinesthetic sensations with or without the addition of pleasantness and unpleasantness. Pikler (Buda Pesth) attacked Külpe's criterion of inability to reproduce feelings, and remarked that it was equally impossible to reproduce an affect such as pride. Pleasantness and unpleasantness were regarded as elements, but not because of Külpe's criteria. The speaker then proceeded to outline his own mechanical

theory in accordance with which pleasantness and unpleasantness correspond to the quantity of the transformation of energy in the body, whereas consciousness in general corresponds to the quantity of work done by the organism. In his response Külpe maintained that the reproduction of certain factors, such as the affect mentioned, which do not possess the characteristic of invariable reality was quite possible, and that real feeling may very well attach to such reproductions without itself being subject to the conditions of reproduction. As for Pikler's general conception of feelings as the determining motives for all our acts, this was rejected. Michotte (Louvain) questioned the reporter concerning the distinction of feeling and function. Response was made that functions possess reality, but not universality. If by content of consciousness we mean discernible objects, then functions cannot be so discerned during their process in consciousness, but only by reflection after the process is complete. Pleasantness and unpleasantness, on the other hand, can be discerned as we experience them. The session was brought to a close by a paper presented by Ogden (Tennessee) on the relation of the esthetic to general feeling experience. From a functional point of view the feelings of pleasantness and unpleasantness, recognition, economic activity — as the basis of the so-called esthetic feelings, and also for similar manifestations of the lower senses — interest and emotion were considered in relation to their bearing on the esthetic attitude, and the latter was defined as a feeling characterized by interest and the absence of dominant motives for adjustment, but essentially independent of the other factors noted.

The principal report of the afternoon was furnished by Lipmann (Berlin) on the evaluation of results obtained with the 'Aussage' method of experimentation. The results were first subjected to certain general criticisms, principally with reference to individual type differences. If A answers 8 out of 10 questions correctly, and B but 5, it does not necessarily follow that A is a more capable reporter than B, because A may be possessed of an inherent capacity for answering the sort of questions asked. Certain formulæ were then described as applicable in evaluating the results of both simple and complex estimations.

The fifth session was opened by Mlle. Ioteyko (Brussels) with a report on the Methodology of Pedagogical Psychology, which was largely devoted to the presentation of ideas towards a quantitative psychology. On the basis of reaction curves of one sort and another, it was proposed that by discovering the equation for these curves one secured as well the law governing the evolution of the phenomena

which they expressed. A careful examination of the parameters of such curves reveals precisely the individual's isolated faculties. We should therefore do well to apply this method to the child and study each parameter separately as a most important supplementation to the synthetic study of the child in its natural condition of complexity. The paper occasioned a lively discussion. The principal objection raised called attention to the practical impossibility of treating a large number of children after this detailed fashion. Among the papers which followed may be noted one by Frau Hösch-Ernst (Munich) describing a musical prodigy possessing unusual attainments in all normal directions, and one by Meyer (Missouri) reporting the results of his modification of Cattell's method of grading as introduced into the University of Missouri.

Apart from the general sessions which have been here described, many sectional meetings were held to give place for individual communications and unfinished discussions.

At the closing session an attempt was made to limit the discussion at future congresses to psychologists whose standing could in some way be vouched for. The movement failed of support. It was recommended that the psychology of the thought process should be a special topic for discussion at the next congress. As has already been reported in the press, the next congress will be held four years hence in America with William James for honorary president, J. M. Baldwin for president, E. B. Titchener and J. McK. Cattell for vice-presidents, and J. B. Watson for secretary.

It is the opinion of many that the greatest benefit which results from such a gathering as this is due to the opportunity which is afforded for the investigators of a science to come into personal contact with one another. In this respect the meeting at Geneva was quite exemplary, and no account of its proceedings can be complete without a reference to the thoroughly delightful entertainments which were furnished the members by the families Flournoy, Claparède and Cellerier, as well as at the official banquet which was tendered by the state and city.

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TITCHENER ON HELMHOLTZ'S EXPLANATION OF COMBINATION TONES.

"Helmholtz himself explained combinational tones as due to the movements of the drum-skin and ossicles. Attempts have since been made to derive them from the vibration of the basilar fibers; but re-

cent investigation seems to show, pretty conclusively, that Helmholtz was right, and that these tones take their physical origin in the middle ear.'[1]

One is surprised to find such results of 'recent investigations' in this admirable new book from the pen of Professor Titchener. 'That these tones take their physical origin in the middle ear,' is just what recent investigations, so far as the writer is aware, do *not* show. If there is any part of Helmholtz's theory that has not stood the test it is just this part. Unfortunately, Professor Titchener cites no literature on these recent investigations.

Helmholtz, as is well known, derived combination tones (1) from the unsymmetrical vibrations of the tympanum, and (2) from the peculiar action of the ossicles. This latter condition he emphasized most. To quote: "But a more important circumstance, as it appears to me, when the tones are powerful, is the loose formation of the joint between the hammer and anvil. If the handle of the hammer is driven inwards by the drum-skin, the anvil and stirrup must follow the motion unconditionally. But this is not the case for the subsequent outward motion of the handle of the hammer, during which the teeth of the two ossicles need not catch each other. In this case the ossicles may *click*."[2] This clicking, he supposes, produces a tone sensation when sufficiently rapid.

Dennert, as early as 1887, reported observations which seem to the writer to overthrow completely this explanation of Helmholtz's.[3] He found individuals who had lost the tympanic membrane and the first two ossicles from both ears, and who nevertheless heard the 'subjective' combination tones in question. A similar case was recently studied by Mr. Bingham and the writer.[4] Our subject heard readily both the *first* and the *second* combination tone from tuning forks. These observations, of course, do not *prove* that the tympanic membrane and the ossicles *cannot* produce combination tones as Helmholtz supposed. They show, however, that Helmholtz's explanation is incomplete and for the most part useless; that it certainly does not touch the most important cause of combination tones.

Helmholtz's mathematical explanation[5] of the effect of asymmetrical vibrations can well have other applications than that which he made

[1] E. B. Titchener, *A Text-book of Psychology*, Part I., 1909, p. 112.

[2] *Sensations of Tone*, p. 158.

[3] *Arch. f. Ohrenheilk.*, XXIV., 1887.

[4] W. D. Bingham, 'Rôle of the Tympanic Mechanism in Audition,' PSYCHOL. REV., XIV., 1907, 229 ff.

[5] *Sensations of Tone*, Appendix XII., p. 412.

of it. The writer has suggested a modification of the Helmholtzian theory of the origin of combination tones which aims to avoid the objections which are fatal to the drum-ossicles explanation, and which has certain other advantages.[1]

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BOOKS RECEIVED FROM OCTOBER 5 TO NOVEMBER 5.

J. S. Mill's Theory of Inductive Logic. GUY ALLAN TAWNEY. In two parts. (Studies, Univ. of Cincinnati.) Cincinnati, Univ. Press, 1909. Pp. 40 and 55.

La Educacion Costarricense. CARLOS GAGINI, Director. Monthly review. Vol. I, No. 2, Oct. 1909.

Rapport sur la terminologie psychologique. ED. CLAPARÈDE. (Extr. des C. R. du Congrès.) Geneva, 1909. Pp. 14.

The Child and His Religion. GEORGE E. DAWSON. Chicago, Univ. of Chicago Press, 1909. Pp. 124. 82 cents.

The Autobiography — A Critical and Comparative Study. ANNA ROBESON BURR. Boston, Houghton, Mifflin, 1909. Pp. viii + 451. $2.00.

Sociology. JAMES QUAYLE DEALEY. New York, Silver, Burdett and Co., 1909. Pp. 405. $1.50.

Habit Formation. STUART H. ROWE. New York, Longmans, Green, 1909. Pp. ix + 308. $1.50.

The Distribution and Functions of Mental Imagery. GEORGE HERBERT BETTS. New York, Teachers College, Columbia University, 1909. Pp. 99.

Die Bedeutung der Tropismen für die Psychologie. JACQUES LOEB. Leipzig, Barth, 1909. Pp. 51. 1 Mark.

Aesthetics. KATE GORDON. New York, Holt, 1909. Pp. v + 315.

The Relative Standing of Pupils in the High Schools and in the University. WALTER FENNO DEARBORN. Madison (Wisc.), Publ. by the University, 1909. Pp. 44.

Les Idées Modernes sur les Enfants. ALFRED BINET. Paris, Flammarion, 1909. Pp. 346. 3 fr. 50.

Imitazione. G. PISTOLESI. Turin, Bocca, 1910. Pp. 190. L. 3.

[1] 'Combination Tones and Other Related Auditory Phenomena,' *Monograph No. 39,* PSYCHOL. REV., 1908. See especially pp. 103–106.

Naturwissenschaft und Monismus. PAUL VOLKMANN. Leipzig, Teubner, 1909. Pp. 38. 1 Mk.

Les sentiments esthétiques. CHARLES LALO. Paris, Alcan, 1909. Pp. 278. 5 fr.

Le mensonge. G. L. DUPRAT. Paris, Alcan, 1909. Pp. 208. 2 fr. 50.

Traité International de Psychologie Pathologique. Tome I^e^, Psychopathologie Générale. A. MARIE, directeur. Paris, Alcan, 1909. Pp. viii + 1028. 25 fr.

NOTES AND NEWS.

WE have received the preliminary announcement of a new bibliographical annual, *Die Philosophie der Gegenwart.* It will contain one or two discussions of very general questions, followed by a classified list of the literature for the year in all branches of philosophy, including psychology; this list will contain brief summaries of each article or publication, and references to reviews of each in all leading philosophical periodicals. The literature will be indexed also. Volume I. will embrace the literature of 1908. Editor, Dr. Arnold Ruge, Heidelberg (Weiss'sche Univ.-Buchhandlung, publishers).

THE eighteenth annual meeting of the American Psychological Association will be held in Boston and Cambridge during Convocation Week in conjunction with the Society of Naturalists and the American Association for the Advancement of Science. The sessions are scheduled for Wednesday, Thursday and Friday, December 29, 30 and 31.

HELEN DODD COOK, B.A., M.A. (Wellesley), Ph.D. (Würzburg, 1909), has been appointed instructor in psychology at Wellesley College.

PROFESSOR H. N. GARDINER, of Smith College, is spending the year in Europe on leave of absence.

MR. W. D. FURRY has been appointed instructor of philosophy in the Johns Hopkins University.

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THE

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SOCIAL PSYCHOLOGY AS COUNTERPART TO PHYSIOLOGICAL PSYCHOLOGY.

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There is the widest divergence among psychologists as to the nature of Social Psychology. The most recent text-book under this title — the *Social Psychology* of Professor Ross — opens with this sentence: "Social Psychology, as the writer conceives it, studies the psychic planes and currents that come into existence among men in consequence of their association." That is, it must confine itself to the "uniformities in feeling, belief, or volition — and hence in action — which are due to the interaction of human beings." Here we find a certain field of human experience cut off from the rest, because men and women influence each other within that field. There result certain uniformities from this interaction and this makes the subject-matter of the science of social psychology. In the same manner one might investigate the psychology of mountain tribes because they are subject to the influence of high altitudes and rugged landscape. Sociality is for Professor Ross no fundamental feature of human consciousness, no determining form of its structure.

In the *Social Psychology* of McDougall, which appeared but a few months before the treatise we have just mentioned, human consciousness is conceived of as determined by social instincts, whose study reveals sociality not as the result of interaction but as the medium within which intelligence and human emotion must arise.

If we turn to standard treatises on Psychology, we find the social aspect of human consciousness dealt with in very varying fashion. Royce, both in his psychology and in the volume, *Studies in Good and Evil*, makes out of the consciousness of one self over against other selves the source of all reflection. Thought, according to Professor Royce,

in its dependence upon symbolic means of expression, has arisen out of intercourse, and presupposes, not only in the forms of language, but in the meanings of language, social consciousness. Only through imitation and opposition to others could one's own conduct and expression gain any meaning for one's self, not to speak of the interpretation of the conduct of others through one's own imitative responses to their acts. Here we stand upon the familiar ground of Professor Baldwin's studies of social consciousness. The *ego* and the *socius* are inseparable, and the medium of alternative differentiation and identification is imitation. But from the point of view of their psychological treatises we feel that these writers have said too much or too little of the form of sociality. If we turn to the structural psychologists we find the social aspect of consciousness appearing only as one of the results of certain features of our affective nature and its bodily organism. The self arises in the individual consciousness through apperceptive organization and enters into relation with other selves to whom it is adapted by organic structure. In Professor James's treatise the self is brilliantly dealt with in a chapter by itself. Within that chapter we see that, as a self, it is completely knit into a social consciousness, that the diameter of the self waxes and wanes with the field of social activity, but what the value of this nature of the self is for the cognitive and emotional phases of consciousness we do not discover. In the genetic treatment given by Professor Angell, the last chapter deals with the self. Here indeed we feel the form of sociality is the culmination, and the treatment of attention, of the impulses, and the emotions, and finally of volition involves so definitely a social organization of consciousness, that in the light of the last chapter the reader feels that a rereading would give a new meaning to what has gone before. If we except Professor Cooley, in his *Human Nature and the Social Order*, and his *Social Organization*, the sociologists have no adequate social psychology with which to interpret their own science. The modern sociologists neither abjure psychology with Comte, nor determine what the value of the social character of human consciousness is for the psychology which they attempt to use.

To repeat the points of view we have noted, some see in social consciousness nothing but uniformities in conduct and feeling that result from the interaction of men and women, others recognize a consciousness that is organized through social instincts, others still find in the medium of communication and the thought that depends upon it, a social origin for reflective consciousness itself, still others find the social aspect of human nature to be only the product of an already organized

intelligence responding to certain social impulses, while others find that an organized intelligence in the form of a self could arise only over against other selves that must exist in consciousness as immediately as the subject self, still others are content to recognize necessary social conditions in the genesis of volition and the self that expresses itself in volition.

Now it is evident that we cannot take both positions. We cannot assume that the self is both a product and a presupposition of human consciousness, that reflection has arisen through social consciousness and that social intercourse has arisen because human individuals had ideas and meanings to express.

I desire to call attention to the implications for psychology of the positions defended by McDougall, by Royce and Baldwin respectively, if they are consistently maintained. The positions I have in mind are the following: that human nature is endowed with and organized by social instincts and impulses; that the consciousness of meaning has arisen through social intercommunication; and finally that the *ego*, the self, that is implied in every act, in every volition, with reference to which our primary judgments of valuation are made, must exist in a social consciousness within which the *socii*, the other selves, are as immediately given as is the subject self.

McDougall lists eleven human instincts: flight, repulsion, curiosity, pugnacity, subjection, self-display, the parental instinct, the instinct of reproduction, the gregarious instinct, the instinct of acquisition, and the instinct of construction. Six of these are social, without question: pugnacity, subjection, self-display, the parental instinct, the instinct of reproduction, and the gregarious instinct. These would probably be the instincts most widely accepted by those who are willing to accept human instincts at all. Four of the others, repulsion, curiosity, acquisition, and construction, would be questionable, or conceivably to be resolved into other instincts. The fact is that McDougall has his doctrine of instincts so essentially bound up with a doctrine of emotions and sentiments that he is evidently forced to somewhat strain his table of instincts to get in the proper number of corresponding emotions. But the fact that is of moment is that the psychologist who recognizes instincts and impulses will find among them a preponderating number that are social. By a social instinct is meant a well defined tendency to act under the stimulation of another individual of the same species. If selfconscious conduct arises out of controlled and organized impulse, and impulses arise out of social instincts, and the responses to these social stimulations become stimuli to corresponding social acts on the

part of others, it is evident that human conduct was from the beginning of its development in a social medium. The implication is highly important for its bearing upon the theory of imitation, which, as is indicated above, plays a great part in current social psychology.

There are two implications of the theory that important social instincts lie behind developed human consciousness — two to which I wish to call attention. The first is that any such group of instincts inevitably provides the content and the form of a group of social objects. An instinct implies first of all a certain type of stimulus to which the organism is attuned. This sensuous content will attract the attention of the individual to the exclusion of other stimuli. And the organism will respond to it by a certain attitude that represents the group of responses for which such an instinct is responsible. These two are the characteristics of an object in our consciousness — a content toward which the individual is susceptible as a stimulus, and an attitude of response toward this peculiar type of content. In our consciousness of this sensuous content and of our attitude toward it we have both the content of the object as a thing and the meaning of it, both the perception and the concept of it, at least implicit in the experience. The implication of an organized group of social instincts is the implicit presence in undeveloped human consciousness of both the matter and the form of a social object.

The second implication has to do with the theory of imitation. Social instincts imply that certain attitudes and movements of one form are stimuli in other forms to certain types of response. In the instinct of fighting these responses will be of one sort, in that of parental care another. The responses will be adapted to the stimulus and may vary from it or may approach it in its own form or outward appearance. It may be that, as in the case of the gregarious instinct, the action of one form may be a stimulus to the other to do the same thing — to the member of the herd, for example, to run away in the direction in which another member of the herd is running. We have no evidence that such a reaction is any more an imitation than if the instinctive response were that of running away from an enemy which threatened the animal. Furthermore, a group of well organized social instincts will frequently lead one form to place another under the influence of the same stimuli which are affecting it. Thus a parent form, taking a young form with it in its own hunting, subjects the instincts which the child form has inherited to the same stimuli as those which arouse the hunting reaction in the parent form. In various ways it is possible that the action of one form should serve directly or indirectly to

mobilize a similar instinct in another form where there is no more question of imitation than there is in the case in which the action of one form calls out, for the protection of life, a diametrically opposite reaction. Another phase of the matter is also of importance for the interpretation of the so-called imitative processes, in lower animal forms and in the conduct of young children. I refer to what Professor Baldwin has been pleased to call the circular reaction, the instance in which, in his terminology, the individual imitates himself. One illustration of this, that of mastication, which sets free the stimuli which again arouse the masticating reflexes, is a purely mechanical circle, similar to that which is responsible for the rhythmical processes of walking, but which has no important likeness to such processes as that of learning to talk. In the latter experiences the child repeats continually a sound which he has mastered, perhaps without being perceptibly influenced by the sounds about him — the da-da-da, the ma-ma-ma, of the earliest articulation. Here we have the child producing the stimulus which in a socially organized human animal calls for a response of another articulation. We see the same thing probably in a bird's insistent repetition of its own notes. The child is making the first uncertain efforts to speak — in this case to himself, that is, in response to an articulate sound which operates as a stimulus upon his auditory apparatus as inevitably as if the sound were made by another. The bird is responding to the note he sings himself as definitely as if he responded to a note uttered by another bird. In neither case is there any evidence that the sound which is the stimulus operates by its quality to induce the child or the bird to produce a sound which shall be like that which is heard. Under the influence of social instincts, animals and young children or primitive peoples may be stimulated to many reactions which are like those which directly or indirectly are responsible for them without there being any justification for the assumption that the process is one of imitation — in any sense which is connoted by that term in our own consciousness. When another self is present in consciousness doing something, then such a self may be imitated by the self that is conscious of him in his conduct, but by what possible mechanism, short of a miracle, the conduct of one form should act as a stimulus to another to do, not what the situation calls for, but something like that which the first form is doing, is beyond ordinary comprehension. Imitation becomes comprehensible when there is a consciousness of other selves, and not before. However, an organization of social instincts gives rise to many situations which have the outward appearance of imitation, but

these situations — those in which, under the influence of social stimulation, one form does what others are doing — are no more responsible for the appearance in consciousness of other selves that answer to our own than are the situations which call out different and even opposed reactions. Social consciousness is the presupposition of imitation, and when Professor Royce, both in the eighth chapter of *Studies of Good and Evil*, and in the twelfth chapter of his *Outlines of Psychology* makes imitation the means of getting the meaning of what others and we ourselves are doing, he seems to be either putting the cart before the horse, or else to be saying that the ideas which we have of the actions of others are ideo-motor in their character, but this does not make out of imitation the means of their becoming ideo-motor. The sight of a man pushing a stone registers itself as a meaning through a tendency in ourselves to push the stone, but it is a far call from this to the statement that it is first through imitation of him or some one else pushing stones that we have gained the motor-idea of stone-pushing.

The important character of social organization of conduct or behavior through instincts is not that one form in a social group does what the others do, but that the conduct of one form is a stimulus to another to a certain act, and that this act again becomes a stimulus to first to a certain reaction, and so on in ceaseless interaction. The likeness of the actions is of minimal importance compared with the fact that the actions of one form have the implicit meaning of a certain response to another form. The probable beginning of human communication was in coöperation, not in imitation, where conduct differed and yet where the act of the one answered to and called out the act of the other. The conception of imitation as it has functioned in social psychology needs to be developed into a theory of social stimulation and response and of the social situations which these stimulations and responses create. Here we have the matter and the form of the social object, and here we have also the medium of communication and reflection.

The second position to which I wish to call attention, and whose implications I wish to discuss, is that the consciousness of meaning is social in its origin. The dominant theory at present, that which is most elaborately stated by Wundt in the first volume of his *Völkerpsychologie*, regards language as the outgrowth of gesture, the vocal gesture. As a gesture, it is primarily an expression of emotion. But the gesture itself is a syncopated act, one that has been cut short, a torso which conveys the emotional import of the act. Out of the emotional signification has grown the intellectual signification. It is evi-

dent that but for the original situation of social interaction the bodily and vocal gestures could never have attained their signification. It is their reference to other individuals that has turned expression, as a mere outflow of nervous excitement, into meaning, and this meaning was the value of the act for the other individual, and his response to the expression of the emotion, in terms of another syncopated act, with its social signification, gave the first basis for communication, for common understanding, for the recognition of the attitudes which men mutually held toward each other within a field of social interaction. Attitudes had meanings when they reflected possible acts. And the acts could have meanings when they called out definite reactions which call out still other appropriate responses; that is, when the common content of the act is reflected by the different parts played by individuals, through gestures — truncated acts. Here is the birth of the symbol, and the possibility of thought. Still, thought remains in its abstractest form sublimated conversation. Thus reflective consciousness implies a social situation which has been its precondition. Antecedent to the reflective consciousness within which we exist, in the beginnings of the society of men and in the life of every child that arises to reflective consciousness, there must have been this condition of interrelation by acts springing from social instincts.

Finally, Professor Baldwin has abundantly exemplified the interdependence of the *ego* and the *socius*, of the self and the other. It is still truer to say the self and the *others*, the *ego* and the *socii*. If the self-form is an essential form of all our consciousness it necessarily carries with it the other-form. Whatever may be the metaphysical impossibilities or possibilities of solipsism, psychologically it is non-existent. There must be other selves if one's own is to exist. Psychological analysis, retrospection, and the study of children and primitive people give no inkling of situations in which a self could have existed in consciousness except as the counterpart of other selves. We even can recognize that in the definition of these selves in consciousness, the child and primitive man have defined the outlines and the character of the others earlier than they have defined their own selves. We may fairly say a social group is an implication of the structure of the only consciousness that we know.

If these positions are correct it is evident that we must be as much beholden to social science to present and analyze the social group with its objects, its interrelations, its selves, as a precondition of our reflective and self-consciousness, as we are beholden to physiological science to present and analyze the physical complex which is the pre-condition

of our physical consciousness. In other words, a social psychology should be the counterpart of physiological psychology. In each case the conditions under which certain phases of consciousness arise must be studied by other sciences, because the consciousness which the psychologist analyzes presupposes objects and processes which are preconditions of itself and its processes. It is true that our reflection can sweep the very physical and social objects which the physical and social sciences have presented within itself, and regard them as psychical presentations. But in doing this it is presupposing another brain that conditions its action, and whose defection would bring collapse to the very thought that reduced the brain to states of consciousness. In the same manner we may wipe the *alteri* out of existence and reduce our social world to our individual selves, regarding the others as constructions of our own, but we can only do it to some other audience with whom our thought holds converse, even if this self is only the I and the Me of actual thought, but behind these protagonists stand the chorus of others to whom we rehearse our reasonings by word of mouth or through the printed page.

The evolutionary social science which shall describe and explain the origins of human society, and the social sciences which shall finally determine what are the laws of social growth and organization, will be as essential for determining the objective conditions of social consciousness, as the biological sciences are to determine the conditions of consciousness in the biological world. By no possibility can psychology deal with the material with which physiology and the social sciences deal, because the consciousness of psychological science arises within a physical and a social world that are presuppositions of itself. From a logical point of view a social psychology is strictly parallel to a physiological psychology.

DISCUSSION.

WHAT IS SOCIAL PSYCHOLOGY?

EDITOR PSYCHOLOGICAL BULLETIN:

Some criticisms on the view I take as to the scope of social psychology in a recent text-book on the subject[1] seem to make it worth while for me to present such justification as I have to offer.

It is becoming clear that there are two competing notions as to what is the subject matter of social psychology. One is the notion held by Baldwin, McDougall and others that social psychology is the psychology of the individual in association; the other is the view represented by Tarde and other continental writers that social psychology is the psychology of society, or, if you please, the consideration of great-scale psychic phenomena. The writer has endeavored to make this conception more precise by defining it as the study of "the psychic planes and currents that come into existence among men in consequence of their association."

The former conception would make social psychology a branch of psychology; the latter would make it a branch of sociology. There is no doubt that there are here two rising and substantial bodies of valuable knowledge competing for the use of the same designation. Whichever succeeds in getting itself called 'social psychology,' the other will, no doubt, contrive to flourish under some other name. The point at issue is not of primary importance, but it is worth while to offer some reasons why it seems better to reserve the term 'social psychology' to designate a branch of sociology.

If out of human psychology be carved a province to be known as social psychology, having to do with all phenomena of the individual mind which arise out of or imply association with other minds, then logically the rest of the science will be known as 'individual psychology,' and will deal with everything in mental development which does not presuppose association. It is hardly necessary to point out that no such line of cleavage has been recognized by the psychologists, nor is it likely to be. A large part of what has been called simply 'psychology' would have to be turned over to 'social psychology.' Not only would the study of the emotions fall under the latter head,

[1] *Social Psychology. An Outline and Source Book.* New York, 1908.

seeing that most of them — love, jealousy, resentment, shame, envy, pity, gratitude, reverence, ambition, etc. — imply a relation to other beings like ourselves, *i. e.*, association, but that of the higher cognitive processes as well — comparison, analysis, abstraction, conception, judgment, reasoning, invention, self-consciousness. Not only would 'individual psychology' come off rather badly in the division, but it would be put in the absurd position of having a myth or a monstrosity for its subject matter — for we have never met nor are likely to meet human beings whose mental life has not been built up on a basis of interplay with other minds, while it is probable that a human being reared under strict isolation would be scarcely distinguishable from an animal or an idiot. It appears then that psychology is not likely to turn over a defined portion of its field to 'social psychology' leaving the residue to constitute the domain of 'individual psychology.'

How is it with sociology?

In consequence of imitation, interference, conflict, discussion, compromise, etc., we find people ranged into great alignments which I have termed 'social planes' and 'social currents' — the former referring to the mental uniformities produced by tradition, convention and rational imitation, the latter referring to the transient uniformity seen in mobs, 'booms,' panics, stampedes, 'landslides,' crazes and fads. These unities are purely mental and do not imply anything in the way of combined action or practical coöperation. The study of them can very naturally be termed 'social psychology.' Beyond this comes the study of the groupings of men for the realization of joint purposes by means of combined effort. This branch of sociology might well be termed 'social morphology,' the study of *social forms*. It is not for a moment to be supposed that the consideration of human groupings such as family, clan, tribe, nation, society, union, church, corporation, or party does not involve attention to many psychological processes as, for example, the emergence of a group consciousness, the formation of a group will, the reaction of the group self upon the personal self. Nevertheless, the principal determinant factors in the life history of the group are to be sought in its constitution and form as, for example, the number of persons associated, whether they are alike or dissimilar, equal or graded, assembled or dispersed, in direct relations or in indirect relations, in constant touch or in occasional touch, whether their association is open or exclusive, public or secret, for general ends or for specific ends, whether the coöperation of the group is guided by the will of a preponderant number or by designated power holders, and whether these power holders are removable or ir-

removable, absolute or responsible, chosen for term or for life, limited in their powers or unlimited.

According to this view the theory of society (neglecting for the present such helpful basement sciences as demography, and 'mesology,' the study of the reaction of the physical environment) would consist of *social psychology* and *social morphology*. If the distinction drawn between these branches is reasonable and helpful, it would seem that sociology has better grounds for appropriating the term 'social psychology' than has psychology.

The writer is aware that the above view is not consistent at all points with his past expressions. Moreover, it may not agree with conclusions he will hereafter reach. There is no reason, however, why the issue presented may not be discussed strictly on its merits without *ad hominem* argument. The writer recognizes that the matter in dispute is one of scientific convenience merely, and he presents his views in the hope that they will call forth whatever weighty reasons exist on the other side of the question.

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PSYCHOLOGICAL LITERATURE.

SOCIAL PSYCHOLOGY.

Human Nature in Politics. GRAHAM WALLAS. London, Archibald Constable & Co., 1908. Pp. xvi + 302. $1.45.

The argument of Mr. Wallas runs as follows: Political science has always been grounded on a conception of 'human nature' or psychology. Criminology, education and economics have been redeemed to some extent from over-simplification, intellectualism and dogma by advances in evolutionary science and psychology, but politics remains in academic lectures and philosophies beautifully rational and symmetrical, in strong contrast with the politics of the street which successfully appeals to primitive 'irrational' motives. However, genuine political impulses are not merely intellectual inferences from calculation of means and end. Personal loyalty, fear, ridicule, the instinct of ownership, the devices of advertising, and the thousands of subtle, subconscious suggestions peculiar to the interaction of individuals in large communities, also operate, for these impulses are manifestations of racial tendencies universally present. The ground plan of human nature is relatively stable; the political environment constantly varies. Our sensations are the raw material of knowledge and represent the conscious channels through which instincts find satisfaction, and political control is often more strongly enforced by symbols drawn from perceptual objects than from ideational considerations. It is difficult to distinguish between rational and non-rational inferences, and in ordinary life no great harm is done, but the "empirical art of politics consists largely in the creation of opinion by the deliberate exploitation of subconscious, non-rational inference."

Reasoning is also a human instrument, and political thinkers must formulate a method and create entities corresponding to the abstractions of physical science. Heretofore a hypothetical 'normal' individual of invariable propensities has been constructed — the economic and political men of intelligent interests and natural rights. But biology has demonstrated the value of 'variation curves' which generalize differences and make variation the basis of uniformity. Politics must likewise reject an over-simplification of its subject matter and theory and adapt itself to quantitative methods, and repeated collection of evidence and opinion from all possible sources.

Political morality, moreover, will change; for when statesmen and citizens become conscious of their own socio-individual conscious processes, control from within becomes inevitable. Perhaps in time an acceptance of causation and 'fact' in political matters and the use of a frankly experimental method of dealing with social problems may be attended with an idealization and moral intensity which hypostatized natural science and fatalistic religion have aroused.

The theory and practice of representative government will be transformed when politics incorporates the psychological doctrine of the organic functioning of intellect, feeling and volition. The Platonic psychology of classes requires an impossible suppression of social contact: the doctrine of 'consent of the governed' implies that collective processes of reaching decisions should be encouraged and regulated: a democratic society needs the discipline which comes from communal feeling, thinking and doing.

The ancient city state was founded upon the principle of perception: it was not to be larger than the span of vision and memory. 'Delocalized' modern states, extended by our means of communication, must rest upon ideation and imagination, not upon immediate observation. Homogeneity must come not from national feeling or racial likeness, but from a recognition of common problems and variable solutions. The Darwinian struggle for supremacy, instead of fostering race hatred, may incite to generous emulation, sympathy and a placing of military instincts in social grooves.

There is a striking similarity in point of view between the contribution of Mr. Wallas and the recent work of Mr. McDougall on *Social Psychology*, although the latter book appeared after the composition of *Human Nature in Politics*. Mr. McDougall pleads for a wider conception of psychology as a 'positive science of conduct and behavior.' Mr. Wallas, aided by experience in local and national English politics, has given a first-hand psychological interpretation of the undercurrents of politics; his book is a discussion of a narrower field but with the same animus as the work of Mr. McDougall.

Instincts, habit, the 'non-rational' — all the shaded lights of consciousness — are the points of departure, and the object of the study is to formulate a working logic of political action on the basis of the evolutionary concept of human tendencies which science has developed since Bentham presented his structural analysis of the simplified middle class citizen, and to avoid the intellectualism and aloofness of neo-Hegelian political philosophers. In so doing Mr. Wallas reaches a view of the place of reason in political

life which incorporates sympathetic impulses and volition, which assumes that since instincts are the stuff to be controlled under the pressure of a constantly shifting environment, the old dualisms of socialism or individualism, government by reason and the elite or blind impulse and the mob, Utopia or chaos, are artificial abstractions which find their due place in concrete emergencies calling for tentative balancing of motive and machinery.

Mr. Wallas does not seem to view imitation as an instinct, and thereby has avoided difficulties attending the circular reaction social psychology. If, with Mr. McDougall, imitation can be resolved into ideo-motor action or combinations of genuine instincts, it is possible to regard the term as a sociological category denoting the roughly uniform repetition of action seen from the standpoint of the observer. For the actor, repetition, imitation, is simply a process of defining and directing his active tendencies. By no juggling can imitation, considered as a separate automatic instinct, become 'rational' and ascend to genius. The process of controlling conflicting instincts may not be adequate and may not come to distinct consciousness in the case of many people, but no one with racial habits and power of perception needs an additional 'instinct' of imitation: tendencies strive for expression and problems are solved in a manner not fully explained by the circular reaction. Mr. Wallas opens the door to all members of the community and invites them to become contributors to its meaning and technique of control because of their unique, individual reaction to so-called objective 'copies.' He explains uniformity on the basis of common problems, originality on the basis of variable solutions.

It is good for American pride to read that Mr. Wallas dates his inspiration to psychologize politics from the reading of James' *Principles* and that he expresses indebtedness to the writing of Jane Addams. But he has not simply applied already worked out psychological doctrines to a new subject matter: he has enlarged and enriched psychology itself by his interpretation.

ERNEST TALBERT.

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The Psychology of Prayer. ANNA LOUISE STRONG. Chicago, University of Chicago Press, 1909. Pp. 122. $0.80.

Prayer is a phenomenon or aspect of the essentially social nature of man. It is an imaginative relation between selves. The self is here regarded as a construct dependent upon social life and social relationships. The process by which a self grows is *always* an 'im-

aginative social process,' whether the personal ideas concerned are referred to physical accompaniments or not. Prayer, as one form of this social process, is one of the means by which the self is built up and determined.

The psychological situation of prayer is thus conceived under the symbolism of the interaction of two selves, which are present together in consciousness and which demand some sort of readjustment. Thus there is the 'me,' or self of immediate purpose and desire, and the objectified self, the 'alter.' The aim of prayer is a unification of these two selves into a larger and more adequate selfhood. On the basis of these assumptions the author outlines the development of the prayer attitude from the indiscriminate prayers of children and primitive types of religion to the highly social and differentiated forms of the developed religious consciousness. The prayer of the child is either of a relatively mechanical character or without definite realization of the sphere or the needs for which prayer is appropriate. Discrimination develops along two lines: on the one hand with reference to efficacy in effecting changes in the external world, and on the other with reference to ethical effects and values as distinct from material needs. The child, as well as the adult of low religious development, prays indiscriminately for all kind of changes in the external world and for material benefits of all sorts, and even for the satisfaction of the slightest whims. There is little of the 'imaginative social process' involved in such prayers. Even on this low plane there are, however, fairly definite objective results, such as the 'establishment of a more confident self,' leading to more effective action, or a different interpretation of the environment, so that for the mind of the subject, there often occurs an actual readjustment of physical things by some external power to conform to his own expectant attitude. Again, subconscious activities may thus be set up which produce results apparently dependent upon the prayer attitude, as in cases of the healing of diseases by prayer. The completely social type of prayer is attained only when it becomes the means of establishing a really larger selfhood in the individual. This attitude in general is expressed by these words quoted by the author: "It would be a shameful misuse of prayer, if trifles which have no significance for our inner life were to be made the object of our prayers." The enlargement of the self of Augustine through this 'imaginative social process' is evident from such words as these: "Thou didst know what I was suffering and no man knew. Thou findest pleasure in us and so regardest each of us as though thou had him alone to care for."

The author regards this imaginative relation of selves as an outcome of genuine need and as one which may easily be set up even though the subject does not believe in the possibility of an actual response from some superior being. This higher social type of prayer has two fairly distinguishable aspects — the 'æsthetic' and the 'practical.' The former type embraces those forms of the prayer attitude in which there is desire for mere communion, companionship, surrender of the immediate self into a larger ideal self, but without any reference to following action. Here prayer is an end in itself, the subject is contemplative. He may or may not seek moral reinforcement. "The [practical] result obtained depends on how far the individual in question identifies the perfectly sublime and perfectly beautiful with the perfectly good."

In the case of the practical type, an ethical objective of some sort is definitely present, such as the 'conversion' of the sinner, moral reinforcement through the building up of a wider and more truly ethical self, etc. This type of prayer the author seems to regard as higher than the æsthetic.

As to the 'reality' involved in the objective reference in prayer, it is, the author holds, inadequate to say that "God makes no contribution that can be scientifically known." It is true that we cannot prove that forces enter from without the total process of experience. And yet some reality must be posited to the other self. It is "objective in the sense in which we posit anything as objective, in that it is outside of the self of immediate purpose." "An 'object' as a psychological fact is a conditioning means in the fulfilment of a purpose, which purpose is always given a subjective reference." The reality of the alter (God?) is regarded by the author as the reciprocal of the reality or organization of the immediate self. The book closes with the statement that the final solution is impossible on psychological grounds.

It seems to the reviewer that a complete and coherent account of prayer on psychological grounds should be as possible here as in the case of a phenomenon of physical science. Even there the explanation is not ultimate but is, nevertheless, coherent and complete from the point of view of physics.

The reviewer has not done full justice to the author's subtle analysis. He feels, however, that the machinery of explanation often obscures rather than clears up the phenomena in question. It is difficult, even for one who is familiar with this point of view, to avoid the feeling that a simpler terminology might have been more serviceable in stating and interpreting the same facts.

IRVING KING.

UNIVERSITY OF IOWA.

Source Book for Social Origins: Ethnological Materials, Psychological Standpoint, Classified and Annotated Bibliographies for the Interpretation of Savage Society. WILLIAM I. THOMAS. Chicago, University of Chicago Press, 1909. Pp. xvi + 932. Library edition, $4.77 postpaid; Student's edition, $2.75.

The publication of this book should mark a long step forward in the study not only of social psychology as a college subject, but in the general movement which shows some signs of finding a new center of reference for the college course. Language and science have formed such centers hitherto, but the social and historical disciplines have been too unorganized or too abstract to fill the place which, on the face of things, the study of human life in its social relations ought to fill. In social psychology particularly the sources have been so multifarious as to present an almost trackless wilderness, into which the propounder of a theory, or the expounder of a specific topic plunged, to return indeed with material for his own purpose but without giving the student much confidence in the method, or in the unbiased character of the conclusions. The present book is admirably adapted to orient the beginner and to serve as the basis for class-room work in the subject.

There are three different kinds of matter in the book:

1. Extracts or complete papers from various authorities, of which some describe customs, institutions, art, etc., of particular peoples, while others deal with general phases of culture or their psychological interpretation. These are grouped under seven heads. The Relation of Society to Geographic and Economic Environment; Mental Life and Education; Invention and Technology; Sex and Marriage; Art, Ornament, and Decoration; Magic, Religion, Myth; Social Organization, Morals, the State. Forty-six selections are included.

2. A general introduction to the material as a whole, and a brief 'Comment' on each part. In the introduction it is maintained that while no single concept such as 'imitation,' 'conflict,' or 'constraint' is adequate to interpret the social process, the concepts of 'control' and 'attention' with the latter's attendant concepts of 'habit' and 'crisis' are highly useful as tools of analysis. In the 'comments' attention is called to changes in scientific standpoint or other considerations to be kept in mind while estimating the various material presented.

3. Bibliographies. Something over a thousand titles, classified according to the main divisions of the work, are given, and there are in addition forty-three pages of supplementary bibliographies at the close. Important works are starred and a brief annotation is given to

the most important. For the student who is already somewhat oriented in the field these bibliographies will be the most useful feature.

J. H. T.

Social Organization, A Study of the Larger Mind. CHARLES HORTON COOLEY. New York, Scribner, 1909. Pp. xvii + 426. $1.50.

This book like its predecessor, *Human Nature and the Social Order*, is luminous in its thought, direct in method, simple in diction and style. As contrasted with the earlier work, which aimed "to see society as it exists in the social natures of man," in the present work "the eye is focused on the enlargement and diversification of intercourse which I have called social organization, the individual, though visible, remaining slightly in the background."

Parts I. and II., on 'Primary Aspects of Organization' and 'Communication' respectively, are perhaps intended for the general reader rather than for the student. They give a clear and orderly presentation of familiar material.

Part III., on 'The Democratic Mind,' and Part IV., on 'Social Classes,' are much more significant. They contain a fresh and first-hand study of conditions and tendencies. Part III. starts with the doctrine that "the central fact of history, from a psychological point of view, may be said to be the gradual enlargement of social consciousness and rational co-operation." The view sometimes expressed that in tribal life there is lack of self-assertion, and that personality of the individual is merged in family or clan, is declared to be 'without foundation' when 'taken psychologically,' although 'from the standpoint of organization there is much truth in this.' (This appears to the reviewer a failure to carry through consistently the author's own central position, that self and society are simply correlative aspects of one reality. If the organization treats clan or group as indivisibly responsible, is it conceivable that this corresponds to no psychological attitude? Or if religion is organized entirely as a family or tribal affair, does not this imply a necessary limitation in psychological self-assertion? Of course *some* selves are asserted just as vigorously in savage life as in civilized life; but the social organization in such cases gives corresponding freedom, as to the warrior, whom the author cites.) "That which most inwardly distinguishes modern life from ancient or mediæval is the conscious power of the common people trying to effectuate their interests." The life of the group under modern conditions may express itself "on a level not merely of the

average member but of the most competent, of the best." Increasing social consciousness is inimical only to the 'individuality of isolation,' not to the individuality which rests on choice. The masses "contribute sentiment and common sense which gives momentum and general direction to progress, and as regards particulars finds its way by a shrewd choice of leaders." This part closes with a thoughtful discussion of the present trend toward social idealism and brotherhood, on the one hand, and of the confusion in standards which favors selfishness and exploitation, on the other.

In Part IV., 'Social Classes,' we have an especially instructive discussion of the present stratification of society. In particular the advantages and disadvantages of 'open classes' as versus more fixed conditions are presented. Most Americans assume that a free opportunity to rise from one class to another — freedom of individual opportunity and career — is an unmixed blessing and in fact leaves little to be desired. But as Professor Cooley well says, "there is also a freedom of class, or of those individuals who have not the wish or power to depart from the sphere of life in which circumstance has placed them:" "not opportunity to get out of them (their groups) but to be something in them; a chance for the teamster to have comfort, culture and good surroundings for himself and his family without ceasing to be a teamster." "That it is wrong to keep a man down who might rise is quite familiar, but that those who cannot rise or do not care to have also just claims, is almost a novel idea." "Now if the ablest men are constantly getting out of a given class the tendency is inevitably to weaken that class, to make it an easy prey, to render it less capable of getting a fair share in the goods of life. The main guaranty for freedom of this latter sort is some kind of class organization which shall resist the encroachment and neglect of which the weaker parties in society are in constant danger." It is further noted that an 'open' class into which all the more ambitious and capable aspire to pass ultimately may be more stable than a fixed higher class, and that such a class exercises upon the ideals of those who hope to enter it, or of those professions which are brought into intimate relation with it, an influence altogether out of proportion to its size. Most of us exist in an "upper-class atmosphere and are so pervaded by it that it is not easy for us to understand or fairly judge the sentiment of the hand-working classes."

Parts V. on 'Institutions' and VI. on 'Public Will' are less satisfactory. They do not give such intensive analysis and hence in many cases hardly present more than the surface and obvious reflec-

tions, but they serve a purpose for the general reader in rounding out a survey of social structure.

J. H. T.

Kafir Socialism and the Dawn of Individualism. DUDLEY KIDD. London, A. and C. Black. Pp. xi + 286.

While the purpose of this book is primarily to consider the practical problems which face the British in dealing with the Kafirs, the first two chapters on 'Primitive Socialism,' and 'Kafir Conceptions of Justice' are excellent statements of Kafir psychology on these points, illustrating further and restating the general views as to Kafir clan life set forth in the author's two former books on the subject.

J. H. T.

Herd Instinct and its Bearing on the Psychology of Civilized Man. W. TROTTER. Sociological Review, 1908, I., 227–248; 1909, II., 31–54.

Sociology is that science whose material is man in society. The key to the problem of conduct in man thus related is feeling, and feeling has fundamental relations to instinct. The instincts regarded as fundamental by psychology are those of self-preservation, nutrition, and sex. But to account for all the facts of human life we must include gregariousness.

Biologically considered, the animal kingdom shows two sudden advances in complexity and in the size of the unit upon which natural selection acts unmodified: the advance (1) from the unicellular to the multicellular, and (2) from the solitary to the social. Progress demands the enlargement of the unit, and, when this is no longer possible by increase of physical complexity, gregariousness appears. There are differences of opinion as to the characteristics of mind due to gregariousness, but it certainly furnishes such characteristics as the feeling of homogeneity with the herd, sensitiveness to the behavior of fellows, instinctive sanctions of beliefs and actions due to the herd impulse, and non-rational opinion arising from belief in affirmations sanctioned by the herd. These non-rational judgments have the quality of instinctive opinion, or obviousness; and to question their truth is to the believer scepticism. When, therefore, we entertain an opinion whose basis involves a quality of feeling which tells us that to inquire into it would be absurd, obviously unnecessary, wicked, etc., that opinion is a non-rational one. This feeling of primary certitude is due to gregariousness.

In distinction from the other instincts, gregariousness exercises a

power from without and confers the sanction of instinct upon acts not necessarily pleasant. With its appearance, duty first appeared in the world, arising from the conflict of gregariousness with the other instincts. From this conflict there are four possible outcomes: The conflict may end (1) through the subsidence of either antagonist; (2) through scepticism as to the nature of the herd suggestion; (3) through rationalization of the problem; (4) in mental disintegration. The second and third of these solutions result in that class of persons called 'mentally stable,' which forms the basis of the state. The fourth includes a part of the insane, victims of nervous diseases, vice, etc., whose characteristic is inadaptability.

The article concludes with some remarks on the possible influence of gregariousness on the future of man.

E. JORDAN.

UNIVERSITY OF CHICAGO.

Zur Psychophysik der industriellen Arbeit. MAX WEBER. Archiv für Sozialwiss. und Sozialpolitik, XXVII., 730–770; XXVIII., 219–277, 719–761; XXIX., 513–542.

The question under consideration in these articles is the causes and conditions of efficiency in laborers. Their interest for social psychology consists chiefly in their suggesting the practicability of attacking social problems upon the psychological side by an adaptation of the methods and results of experimental psychology combined with the statistical and other empirical methods of the social sciences.

While it would be difficult to devise laboratory experiments that would accurately reproduce all the conditions of work in a factory, we can hope to see this done to some extent, and, what is of more importance, the results already obtained in psychophysics are of value in furnishing information, and suggesting points to be observed in the study of workingmen. The work of Kraepelin and his school is especially important for this purpose, and their contributions upon such subjects as practice, fatigue, relaxation, habit, and pauses are carefully considered, and their significance for this problem estimated.

However, these factors are only part of those to be taken into account. The efficiency of a workman at his machine is not merely a problem in psychophysics to be explained by the mechanical conditions of the machine, and the psychological principles capable of mechanical statement and experiment involved in his relationship to the machine. Only to a certain extent does labor thus become mechanized. His efficiency depends also upon his age, sex, domestic condi-

tion, education, temperament, and mood. It is further influenced by his intellectual and emotional attitudes and convictions upon such matters as labor tactics (*e. g.*, limitation of product in piece work), political issues (social democracy), and even religion (pietism having a clearly observable influence, and probably Catholicism also).

A minutely detailed account of the performance for some months of several workers engaged in weaving linen in a textile factory is reported and interpreted. Though the value of the results is acknowledgedly rendered uncertain by the necessarily small number of workers whom it was possible to study in this thorough manner, the rules governing the general tendency toward increased efficiency as a result of practice seem fairly clear, and the results of the other factors are noticeable and to some extent explainable. A clearly defined curve of efficiency for the different days of the week was found, Monday revealing the lowest degree of efficiency, and Wednesday the highest. The causes of this are extraneous to the work itself, and to be discovered in the manner of life of the workers. The individual life history of each worker includes the really important factors to be taken into account in addition to the mechanical elements, and must be made the subject of careful observation and study. This cannot be avoided by superficial classification into types based on 'mental tests' (such as the ergograph or reaction apparatus might suggest), nor by the employment of such vague or imperfectly understood conceptions as *milieu* or heredity.

While the results gained from the investigations reported do not impress one as extensive, and while large results can only be expected from this method when it has been employed by numerous workers in lengthy, detailed, and painstaking investigations, the arguments seem convincing that only by such faithful, thorough, and detailed work can any really scientific knowledge upon such subjects be had, and that in this way it can be obtained. As an instructive contribution to methodology the articles deserve the serious consideration of social psychologists.

W. K. Wright.

University of Wisconsin.

Le greffage social. Raoul de la Grasserie. Revue internat. de Sociologie, 1909, XXVII., 321–358.

Grafting, a common practice in the vegetable, and by no means uncommon in the animal world, exists in society as well. The chief manifestations are classified as (1) ethical, as illustrated by the influ-

ence of the Greeks upon the barbarians, the Romans, and later upon the peoples of the Renaissance; (2) familial, as shown in the rite of adoption among the Chinese, Romans, etc.; (3) hereditary, as seen in education, both express and implied in institutions; (4) religious, as illustrated in the fusion of Greek and Roman gods; (5) political, as shown in one of its phases by the passage of republics (such as the Roman) into empires; (6) judicial, as shown by the fusion of the Roman and continental civil codes; and (7) the more strictly intellectual grafting as seen in language, literature, art and science.

In order to succeed, certain conditions are necessary: (1) there must be a certain homogeneity between the stem grafting, and that which is grafted upon; (2) the former must be of a better species, *i. e.*, higher in rank, while (3) the latter must be more vigorous and hardy, able to supply the lack of strength of the former. The principal instruments in the process are (1) war (though the influential stem may be either victor or vanquished), (2) religion, and (3) commerce. Certain obstacles present themselves in many instances otherwise favorable, viz., (1) the spirit of opposition, as shown in the 'closed door' of the eastern world, or (2) conflicting interests of social classes, or (3) the 'indolence natural to man' which shrinks from the actual work involved. The effects of the process are (1) the addition to the one stem of the more valuable qualities of the second, and (2) the preservation for a long period of those qualities which would otherwise soon disappear. The essential nature of the process of grafting, here as elsewhere, consists in uniting the superior quality of a failing and disappearing subject to the more vigorous and robust nature of an object of inferior quality.

W. C. Vogt.

University of Chicago.

L'anthropologie psychologique, son objet et sa methode. H. Pieron. Revue de l'école d'anthrop. de Paris, 1909, XIX., 113–127.

Anthropology has neglected too much the psychological phase of its subject. The various sciences included under the study of man have an identical subject-matter, and investigations in one should be able to throw light on others. The fact that even the physiological phase of primitive peoples promises interesting results commends the field to the psychologist. May not the reciprocal relations of men influence the mental equipment of the individual not only as regards social activities, but also as regards the fundamental psychological functions, as memory, attention and even perception? The results of

such investigation could be used to throw light on questions such as the determination of the characters and causes of professional superiority, the relative influences of sex-difference, the problem of heredity and that of ontogenesis versus phylogenesis, etc.

W. C. VOGT.

Sexual Education and Nakedness. HAVELOCK ELLIS. Amer. Journal of Psychol., 1909, XX., 297–317.

Nakedness existed in the games of the Greeks and the theatres of the Romans, but with the identification of it with 'the flesh' and its consequent condemnation by Christianity it became repressed, although it appeared in various forms during the middle ages. But it gradually became 'aristocratic,' as versus the plebeian 'slavery of clothes,' and with the triumph of democratic sentiments in the 19th century its repression became complete, as shown by missionary zeal in clothing savages, failing to note the degrading and injurious character of their work. But this extremity caused a reaction in many minds, and an opposite movement has begun, advocating the practice of nakedness in gymnasiums, bathing places, and the like, on grounds of hygiene, in the interest of rational sexual training, and because of a certain positive moral value.

W. C. VOGT.

PSYCHOLOGY OF RELIGION.

Some Notes on the Evolution of Religion. IRVING KING. Philos. Review, 1909, XVIII., 38–47.

The forms of religion are so closely correlated with the social milieu which produces them that we cannot attempt to arrange them in a scale of higher and lower until we are able to evaluate the social background. Religions generally are so definitely the outcome of particular social conditions that no such external characteristics as fetichism, animism, theism, and the like, can place the religions of different groups in any vital relationship. A comparative study, as far as it is possible at all, might however start from the assumption that in different social matrices there are specialized attitudes having functional elements in common, such as might be called religious.

It seems that some criterion of religion might be formulated in terms of social psychology which would at least serve as a working hypothesis, its validity to be determined through its use. Certain elements in the life of a people come to consciousness as having peculiar value, and therefore the religious attitude, a special case of this larger

sense of value, is directly related to and is an integral part of the practical and spontaneous adjustments of the people concerned. If this is the correct view, there is no such thing as a permanently existing religious instinct, sense or attitude, which continues independently of these objective conditions of life.

J. J. TAFT.

UNIVERSITY OF CHICAGO.

Religion and the Psychical Life. EDWARD SCRIBNER AMES. Inter. Jour. of Ethics, 1909, XX., 48–62.

This article is a chapter from a forthcoming book on the Psychology of Religion and gives its viewpoint.

The results of genetic social psychology make it possible to overcome the various partial and limited conceptions of the relation of religion and life. Since the religious consciousness according to these results is just the consciousness of the greatest interests and purposes of life in their most idealized and intensified forms, it is evident that in its generic nature religion is a most intimate aspect of human life. Everywhere the sacred objects and functions are those in which the life of society is felt to center. But different stages in social development estimate these things differently and express social valuations in different ways. The moralization of religion moves forward with the practical and ethical developments of the race. If the organized, institutionalized forms of religion appear barren and powerless, it is likely that a more real and vital religious consciousness will be found in other social movements which are not yet designated as religious and may not even regard themselves as such.

The ideal values of each age and of each type of social development tend to reach an intensity and a volume and a symbolic expression which is religious. Morality, then, cannot be separated from religion. Some forms of early religious consciousness may be lacking in moral quality but no genuinely moral consciousness can be without religious quality. In so far as religion is non-moral, it is primitive and controlled by custom. On the other hand, all moral ideals are religious in the degree to which they are the expression of great, vital interests of society. Religion, like every other specialized interest of man, involves the reaction of his entire nature. It is not the product of any one agency within him. In its most natural, normal development, it is just the expression and appreciation of those ideal relationships and values which are inherent in all earnest moral effort.

J. J. TAFT.

Religious Folk-Songs of the Southern Negroes. H. W. Odum. Amer. Jour. of Rel. Psy. and Ed., 1909, III., 265–365.

To obtain the truest expression of the folk-mind and feeling is to reveal much of the inner consciousness of a race. And the knowledge of those evidences which are most representative of race-life constitutes the ground work of a knowledge of social and moral tendencies, hence of social and moral needs. The student of race traits and tendencies must accept testimony from within the race, and in the study of race character the value of true expressions of the feelings and mental imagery cannot be overestimated.

As a part of folk-lore, folk song represents less of the traditional and more of the spontaneous. In revealing what he is, the folk songs of the southern negro are superior to any superficial study made from partial observations. The songs here presented are the representative average religious songs current among the common mass of negroes of the present generation. An analysis of these songs brings out certain mental traits of the negro together with the essential qualities of his religion. Perhaps the most interesting points made, from the standpoint of social psychology, are the negro's indifference in regard to home and family, and the ideality and impracticality of his religion.

J. J. Taft.

BOOKS RECEIVED FROM NOVEMBER 5 TO DECEMBER 5.

La Psychologie Sociale de Gabriel Tarde. Amédée Matagrin. Paris, Alcan, 1909. Pp. 352. 5 fr.

Problèmes de Psychologie Affective. Th. Ribot. Paris, Alcan, 1909. Pp. 270. 2 fr. 50.

Consciousness. Henry Rutgers Marshall. New York, Macmillan, 1909. Pp. xv + 685. $4.00 net.

Le Problème Morale et la Pensée Contemporaine. D. Parodi. Paris, Alcan, 1909. Pp. 210. 2 fr. 50.

Die Geistige Ermüdung. Max Offner. Berlin, Reuther u. Reichard, 1909. Pp. vi + 88. M. 1.80.

Why American Marriages Fail. Anna A. Rogers. Boston, Houghton Mifflin Co., 1909. Pp. 214. $1.25 net.

Tlingit Myths and Texts. John R. Swanton. Washington, Government Printing Office, 1909. Pp. viii + 451. (Bulletin 39, Bureau of American Ethnology.)

La Joie Passive. M. MIGNARD. Paris, Alcan, 1909. Pp. xii + 276. 4 fr.

Clavis Universalis. ARTHUR COLLIER. Ed. w. introd. and notes by ETHEL BOWMAN. Chicago, Open Court Publ. Co., 1909 Pp. xxv + 140.

NOTES AND NEWS.

THE fifth annual meeting of the Southern Society for Philosophy and Psychology will be held in affiliation with the Southern Educational Association at Charlotte, N. C., beginning Tuesday, December 28, 1909.

KARL T. WAUGH, Ph.D. (Harvard), of the department of psychology of the University of Chicago, has been elected to the chair of philosophy and psychology at Beloit College.

THE present number of the BULLETIN, dealing especially with social psychology, has been prepared under the editorial care of Professor J. H. Tufts.

THE following appointments are noted in the press: Dr. Edmund B. Huey, of the University of Pittsburg, to the charge of a new department of clinical psychology in the state institution for the feeble-minded, at Lincoln, Ill. G. N. Gilbertson, A.M., to be instructor in psychology at the University of Colorado. Dr. G. C. Fracker, of Coe College, to the chair of psychology and education at the State Normal School, Marquette, Mich. Dr. L. S. Anderson, of Marquette, to the University of Illinois. Dr. F. S. Newell to the chair of philosophy and psychology at Coe College. Dr. Edwin Katzenellenbogen to be lecturer in abnormal psychology at Harvard University. Dr. E. H. Henderson, from the chair of education and psychology to that of philosophy at Adelphi College, Brooklyn. Professor Joseph Jastrow, of the University of Wisconsin, will give graduate courses in psychology at Columbia University in the second semester of this year.

THE first number of a new monthly, the *Journal of Educational Psychology*, is announced for January. The editors are W. C. Bagley, J. Carleton Bell (managing editor), C. E. Seashore, and G. M. Whipple (subsc. $1.50; Williams & Wilkins, Baltimore, publishers).

ERRATUM. — On page 421, line 11, for *inadaptibility* read *sensitivity*.

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